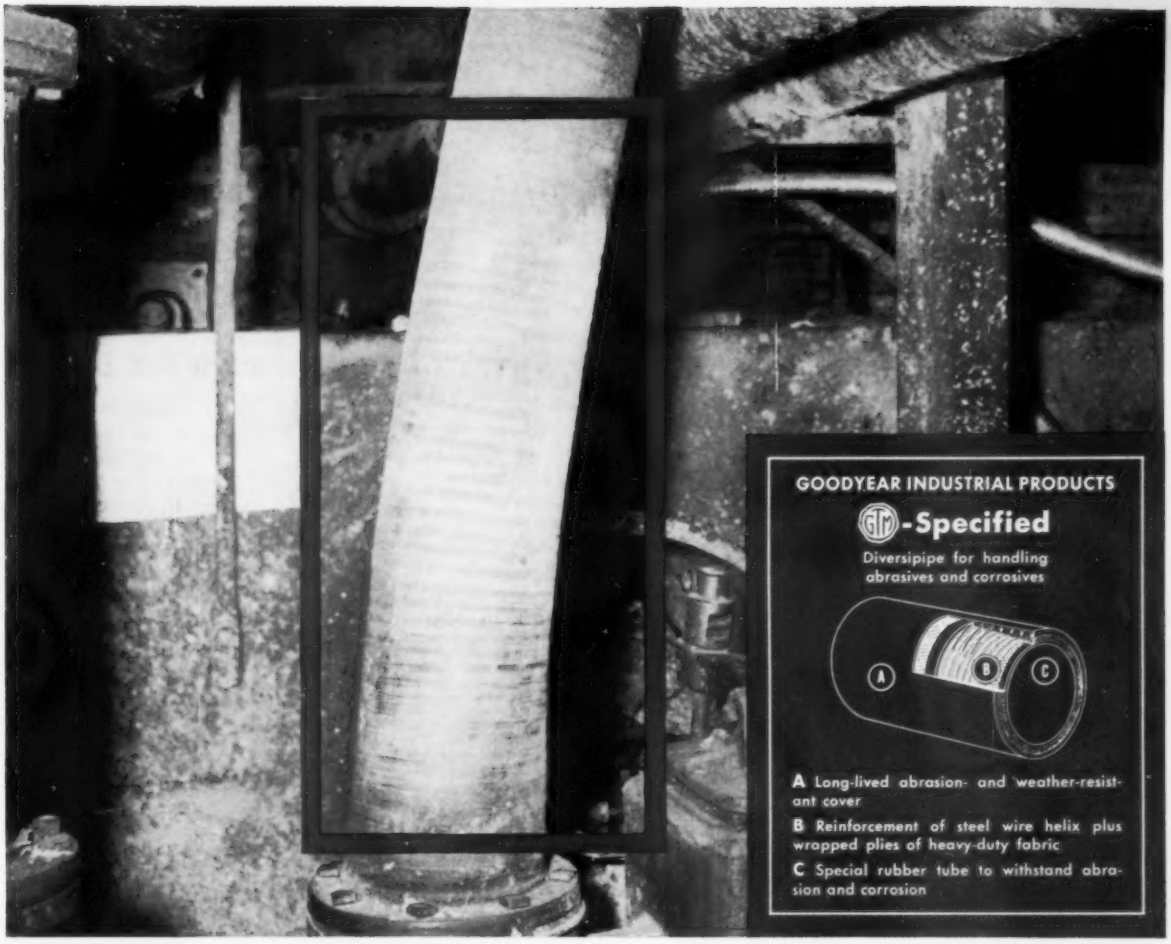

GOODYEAR INDUSTRIAL PRODUCTS
G.T.M.-Specified
Diversipipe for handling abrasives and corrosives
A
B
C
A Long-lived abrasion- and weather-resistant cover
B Reinforcement of steel wire helix plus wrapped plies of heavy-duty fabric
C Special rubber tube to withstand abrasion and corrosion

Pipe fails after 9 months—hose goes 6 years

They hardly expected a materials handling problem at this Ohio boxmaking plant. After all, there's nothing very abrasive-*looking* about paper slurry. But the fact remained, it was eating through heavy steel pipe in a scant 9 months or less.

Here was a problem, they felt, for the G.T.M.—Goodyear Technical Man. And it was a job, as he saw it, for Diversipipe—the rugged, flexible rubber pipe designed to stand up to the roughest sort of abrasive use.

Result: the G.T.M.'s Diversipipe has now been on the job for 6 years—more than 8 times the longest pipe-life. And it's still in fine shape.

If you're losing money down the pipe at your plant, call for the G.T.M. He can recommend from hundreds of types of hose—each designed to do a specific job better—and cheaper. Contact him through your Goodyear Distributor—or by writing:

Goodyear, Industrial Products Division
Akron 16, Ohio

. . .

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

HOSE FOR ALL INDUSTRY BY

GOODYEAR

60th GOODYEAR ANNIVERSARY

THE GREATEST NAME IN RUBBER

Diversipipe—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

For more facts circle 502 on Reply Card

RICHARD H. MORRIS
Editorial Director

EDITORIAL STAFF

THOMAS E. HANSON, *Editor*
R. L. MARINELLO, *Managing Editor*
EMIL B. SKUBIK, *Associate Editor*
H. E. B. ANDERSON, *Associate Editor*
M. E. WEISSMAN, *Associate Editor*
M. E. HENIKEN, *Equipment Editor*
VERNON T. KEMPF, *Electrical Editor*
MILDRED NOVOSEL, *Editorial Assistant*
BEA BERGHORN, *Editorial Production*
FLORENCE JARRETT, *Editorial Assistant*
JAMES E. WILCOX, *Art Director*
RICHARD TREFILEK, *Staff Artist*
TED CIEPLEY, *Draftsman*
ALICE WHEATLEY, *Artist-Draftsman*

Technical Publishing Co.
308 E. James St.
Barrington, Ill.

KINGSLEY L. RICE, *President*
EDWIN C. PROUTY, *Exec. Vice Pres.*
EDWIN C. PROUTY, JR., *Secretary*
ARTHUR L. RICE, JR., *Treasurer*
ANDREW W. KRAMER, *Tech. Asst. to Pres.*
JOHN O. AARVOLD, *Prod. Manager*
WM. J. SALKELD, *Asst. Prod. Mgr.*
EUGENE ZUCKER, *Research Director*
MARGARET HOAGLAND, *Research Assoc.*
JOSEPHINE GEAR, *Asst. Adv. Mgr.*

DISTRICT MANAGERS

BOSTON & NEW ENGLAND
Charles R. Lippold
5 Spring St., Riverside, Conn.
Phone: NEptune 7-2210

NEW YORK: Richard Y. Fuller
842 Graybar Bldg., New York 17, N. Y.
Phones: MUrray Hill 5-3779,
LExington 2-0308

PHILADELPHIA: Oscar Wilds
1235 Jericho Road, Abington, Pa.
Phone: TUrner 7-6688

JOHN R. MORRISON
Western Sales Manager

CHICAGO: John R. Morrison
Walter Painter
Robert L. Dickson
110 S. Dearborn St., Chicago 3, Ill.
Phone: DEarborn 2-5453

OHIO-MICHIGAN:
Robert L. Dewey
557 W. Glenwood St.
North Canton, Ohio
Phone: HYacinth 9-7593

PITTSBURGH: James B. Tafel
404 Frick Bldg., Pittsburgh, Pa.
Phone: COurt 1-4878

DENVER: McDonald-Thompson
Robert H. Heidersbach
222 Colorado Nat'l Bank Bldg.
Denver 2, Colo.
Phone: KEystone 4-4669

PACIFIC COAST: McDonald-Thompson
J. Leslie Meek, 625 Market St.
San Francisco 5, Cal. Phone: YUkon 6-0647

Connie J. Grabb, 3727 West Sixth Street
Los Angeles 5, Cal. Phone: DUnkirk 7-5391

Harry Abney, 1008 Western Ave.
Seattle 4, Wash. Phone: MAin 3-3766

SOUTHWEST: McDonald-Thompson
Frank N. Vickrey, Rm. 214
3217 Montrose Blvd., Houston 6, Texas
Phone: JAckson 9-6711

Ted R. Trautman, 2010 South Utica
Tulsa 4, Okla. Phone: RIverside 3-1981

EPA NBP

Copyright 1958 by Technical Publishing Co.

'ROUND ABOUT

with the editors in field and office

Edited by R. L. Marinello

Appointments at Lockheed

Emil J. Docekal was recently promoted to plant engineer at Lockheed's Georgia Division at Marietta, Georgia. He replaces **Leslie D. Myers** who was promoted to chief manufacturing engineer of Lockheed's Missile Systems Division, Sunnyvale, California.

Docekal joined Lockheed as a construction engineer. In October, 1954, he was promoted to supervisor. In January of this year he was named maintenance superintendent.

J. V. Saylors, succeeding Docekal, was appointed general foreman of the general maintenance department. He joined the company in **1951.** Since then he has held several supervisory positions in the buildings and grounds department.

Sanitation Maintenance Show Changes Meeting Place

THIRD ANNUAL Industrial and Building Sanitation Maintenance Show, originally scheduled to be held at Convention Hall in Philadelphia, will now be held in New York at the New York Trade Show Building. Dates of the show are November 3 through the 6.

Concurrently with the show, the Institute of Sanitation Management will hold its annual Conference Program.

Additional information may be obtained by writing to Institute of Sanitation Management, 19 W. 44th St., New York 36, N. Y.

Planned Maintenance Pays

PLANNED MAINTENANCE of industrial equipment would enable America to boost its output of goods by at least 10 per cent, using present tools and machinery, according to Karl J. Doll, Manager of General Electric's Service Shops Department.

He mentioned that the avoidance of unanticipated machine breakdown "could produce this increase and possibly a whole lot more." He predicted that because of the growing trend of automation, where several operations are dependent one on the other, the task of maintaining machinery will prove to be one of the major sources of new jobs within the next 10 years.

Mayers Promoted to Chief Engineer

John W. Mayers has been promoted to chief engineer of the Pittsburgh Coke & Chemical Company. As chief engineer, he will be responsible for all design, construction and engineering activities of the company's plant facilities. He was formerly plant engineer of the Chemical Division.

Mr. Mayers joined the company in 1955. He had previously been associated with the Sharples Chemical Division of Pennsalt Chemicals Corporation as chief engineer and with the Monsanto Chemical Company.

He holds a professional engineer's license in the states of Ohio, Michigan and Texas and is a member of he American Institute of Chemical Engineers and the Plant Engineers Association of Greater Pittsburgh, a chapter of the American Institute of Plant Engineers.

Fire Brigade Organization and Training

AN ORGANIZED fire brigade is a step ahead when it comes to controlling a plant fire. That's why it is so important to see that your fire brigade team is acquainted with any and all phases of fire prevention.

Some helpful suggestions will be found in the booklet "Training Your Fire Brigade to Use First Aid Extinguishers." One chapter tells how you should organize your fire brigade, how big it should be, selection of personnel, duties of the fire brigade, mapping fire extinguisher locations, chart of responsibility and others.

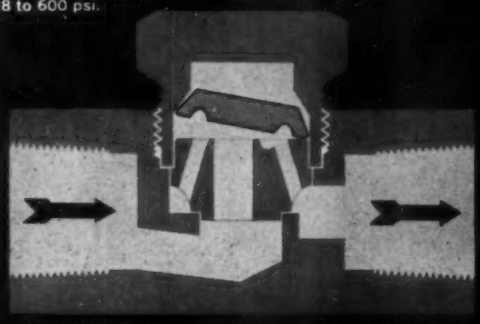
Another chapter covers all phases

Subscriptions: U.S.A. $10, Canada $11. Other countries $12 per year. Single copies $1. Change of address: Send to PLANT ENGINEERING, Circulation Division, Barrington, Illinois. Please supply position title, company name, company address. Request must reach us by 15th of month to make the change effective with following month's issue. Published monthly and accepted as controlled circulation publication at Chicago, Ill.

NEW YARWAY IMPULSE* STEAM TRAP ENGINEERED FOR YOUR LIGHT LOAD REQUIREMENTS

YARWAY NO. 30

Actual size new Yarway No. 30 (½" size). For all pressures 8 to 600 psi.



Cross-section Yarway No. 30 shows lever valve in open position.

- **Economy of operation on light loads**
  - **Closer shut-off**
  - **Quieter operation due to lever action**
- **Economy of Maintenance**
  - **Replaceable valve-seat assembly**
  - **One moving part**
  - **Stainless steel construction**

Put this trap on tracer lines, steam line drips and other light load applications. Order from your local Yarway distributor.

For free bulletin, write Yarnall-Waring Company, 100 Mermaid Ave., Philadelphia 18, Pa.

*IMPULSE . . . A COMPLETE LINE OF STEAM TRAPS, OPERATING ON A PROVEN THERMODYNAMIC PRINCIPLE.

YARWAY

impulse®

OVER 1,250,000 ALREADY SOLD

USE THESE YARWAY IMPULSE TRAPS FOR ALL OTHER STEAM TRAP NEEDS

NORMAL NEEDS Famous Series 60 Impulse traps (pressures to 400 psi) and Series 120 (pressures to 600 psi) meet most normal needs

EXTRA HEAVY CONDENSATE LOADS Series 40 Impulse traps have extra large capacity to handle large volumes of condensate

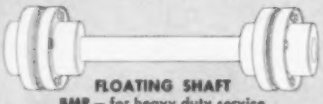
POWER PLANT AND MARINE SERVICE Yarway Integral Strainer Traps fill the bill for marine and high pressure power plant jobs

For more facts circle 503 on Reply Card

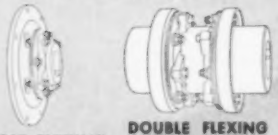
Specify
THOMAS
ALL METAL
FLEXIBLE COUPLINGS
FOR MAINTENANCE FREE POWER TRANSMISSION on PUMP, COMPRESSOR, MARINE and OTHER DRIVES

DBZ — for high speed, heavy duty drives

Thomas' 40 years of flexible coupling experience is at your disposal to help you meet ordinary applications or special variations for unusual cases.



FLOATING SHAFT
BMR — for heavy duty service with excessive misalignment



SINGLE FLEXING
SS — for engine-driven generator sets with out-board bearings

DOUBLE FLEXING
AMR — for engine and medium speed drives

UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES.

1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
4 Visual Inspection While in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

Write for Engineering Catalog

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U. S. A.

For more facts circle 504 on Reply Card

'ROUND ABOUT

of training, as well as describing various types of extinguishers along with the advantages and limitations of each.

This booklet is available to those in charge of fire brigade training. Send your request, on company letterhead, to Walter Kidde & Company, Inc., Dept. A, 675 Main St., Belleville, New Jersey.

Electrostatic Spray Painting

ROUNDING OUT the course of instruction at its spray painting school to cover all aspects of industrial finishing, the Binks Manufacturing Company has added electrostatic spray finishing.

In the new electrostatic course students will have an opportunity to actually set up and operate an electrostatic system. They will learn power requirements for such a system, optimum air and material pressures, gun positions and what products are best suited for electrostatic finishing.

The spray painting school sessions are held every month of the year except July and August. For information, write to B. J. Hedger, Binks Manufacturing Company, 3122 Carroll Ave., Chicago 12, Illinois.

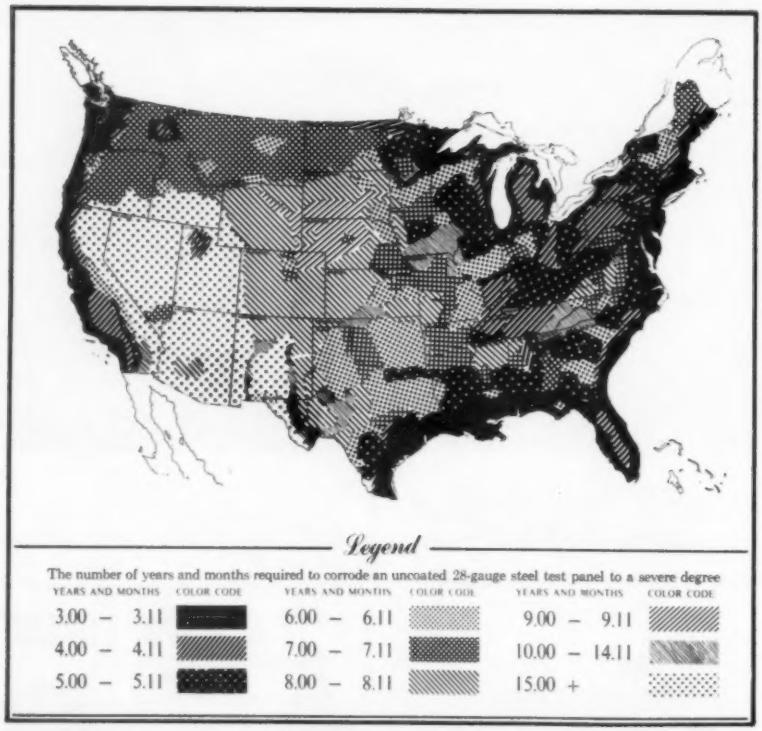
See How Soon Uncoated Test Panels Will Rust in Your Area

COMPARATIVE RATES at which rust proceeds in different parts of the country, have been established for the first time for all United States cities over 10,000 population.

The rates were disclosed in the Rust Index, published by the Rust-Oleum Corporation, Evanston, Ill. Of the 523 cities listed, 221, or 42 per cent, were indexed as Class I, meaning that uncoated test panels rusted in less than four years.

Ninety-five cities were placed in Class II, where test panels rusted in four to five years. The total of 316 cities in Classes I and II comprise 60 per cent of the nation's cities where uncoated panels rusted in five years or less.

Rust-Oleum Corporation estimates that the nation's rust bill is currently about $7.5 billion per year, an increase of $2 billion over the annual toll 10 years ago.



Map indicates how long it takes for a 28-gage steel test panel to corrode to a severe degree. Fastest rate, three years, is in Buffalo, Rochester, N.Y.; Erie, Pa.; and Miami, Fla. Slowest rust rate, more than 15 years, is in Tucson, Arizona.

for greater strength . . . easier assembly

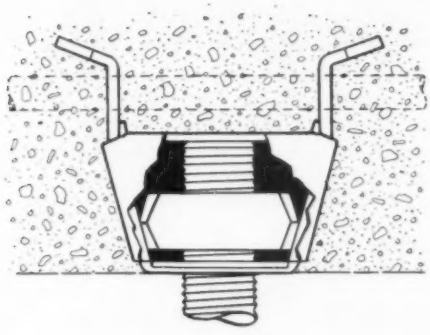
The new Grinnell Wedge Type Concrete Insert

Fig. 281

NEW design features give Grinnell's Wedge Type Concrete Insert (Fig. 281) greater load carrying capacity . . . 1200 lbs. for ⅝" and ¾" sizes, with a safety factor of at least 5 to 1.

Heavy gauge steel is die-formed into a wedge-shaped box housing. When load is attached to the inserted nut and rod assembly, ends of the elongated nut press on the wedge-slanted walls.

These walls, acting in compression with the concrete, provide strength unmatched in steel inserts of equal size.



Preassembly of the elongated nut on the rod makes quick assembly possible.

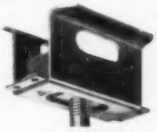
Installations can be made in quick time, too. Just a few turns of the rod tighten the nut rigidly in place. Slightly loosening the nut permits lateral adjustment along the full length of the slot, without fear of rod and nut falling out of the body.

Single body size accommodates four different interchangeable nut and rod sizes, to make ordering easier and installation simpler—especially where hanger rod sizes cannot be determined in advance of ceiling construction.

On your next project, specify Grinnell Concrete Inserts — either steel or malleable iron. Quality manufactured . . . *and priced right!* Grinnell Company, Inc., Providence 1, R. I.

CB-Universal Malleable Iron Concrete Insert (Fig. 282)

CB-Junior Malleable Iron Concrete Insert (Fig. 279)



Wrought Steel Concrete Insert (Fig. 280)

GRINNELL

PIPE HANGERS AND SUPPORTS

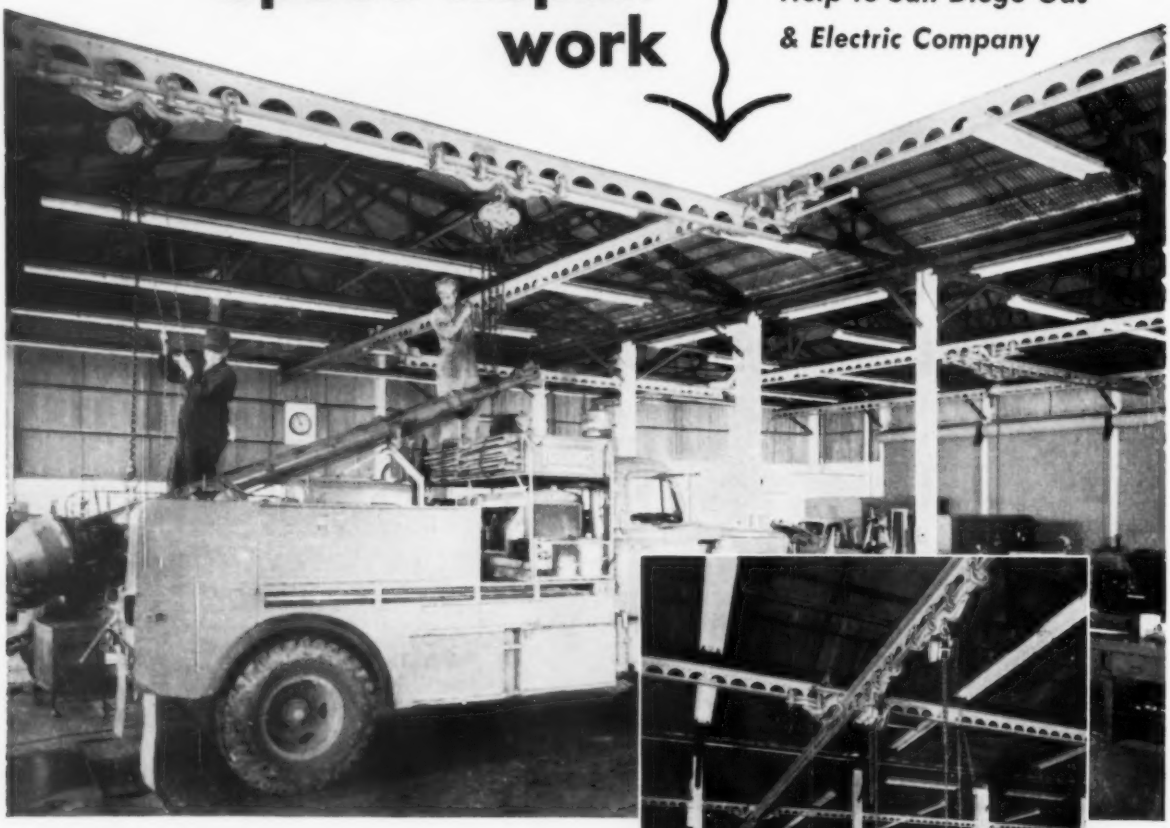
Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

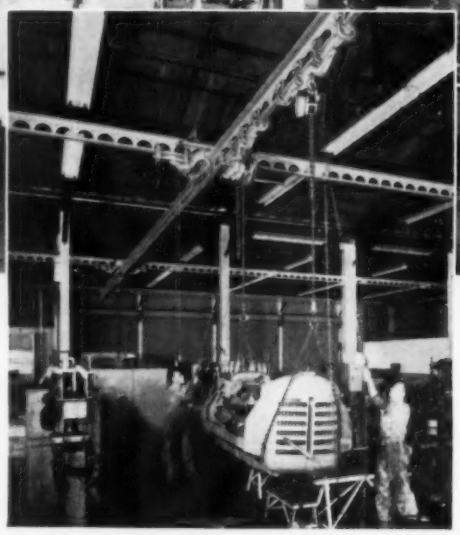
pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic fire protection systems • Amco air conditioning systems

For more facts circle 505 on Reply Card

Hand Propelled Cranes Speed Repair work

Tramrail Transfer Crane System Great Help to San Diego Gas & Electric Company





Lowering a power-driven post hole auger onto a line construction truck. The handy Tramrail cranes are always close at hand ready to handle jobs like this quickly. The entire Tramrail system has a rated capacity of two tons.

Hoisting a heavy air compressor. The crane is shown interlocked with a spur track. At the other end of spur track is another crane in interlocked position. If desired, the compressor can be moved directly to the far crane, thus eliminating rehandling.

HEAVY lifts are made quickly and easily with minimum man-minutes of labor in the Repair Shop of San Diego Gas & Electric Company, San Diego, Calif., by means of a Cleveland Tramrail hand-propelled transfer crane system that covers and connects the working areas.

Because of Cleveland Tramrail's design, which provides unusually smooth, easy rolling action, hand-propelled equipment has proven satisfactory for most repair shop requirements. Of importance, too, hand-propelled cranes are low in original cost, simple to install and cost practically nothing to maintain. If it is found desirable at any time to have electric hoists and motorize bridge and carrier motions, this can be done with nearly all Cleveland Tramrail hand-propelled systems.

Whatever equipment your materials handling situation requires — hand-propelled — electrified in whole or part — automatic — Cleveland Tramrail engineers stand ready to serve you.

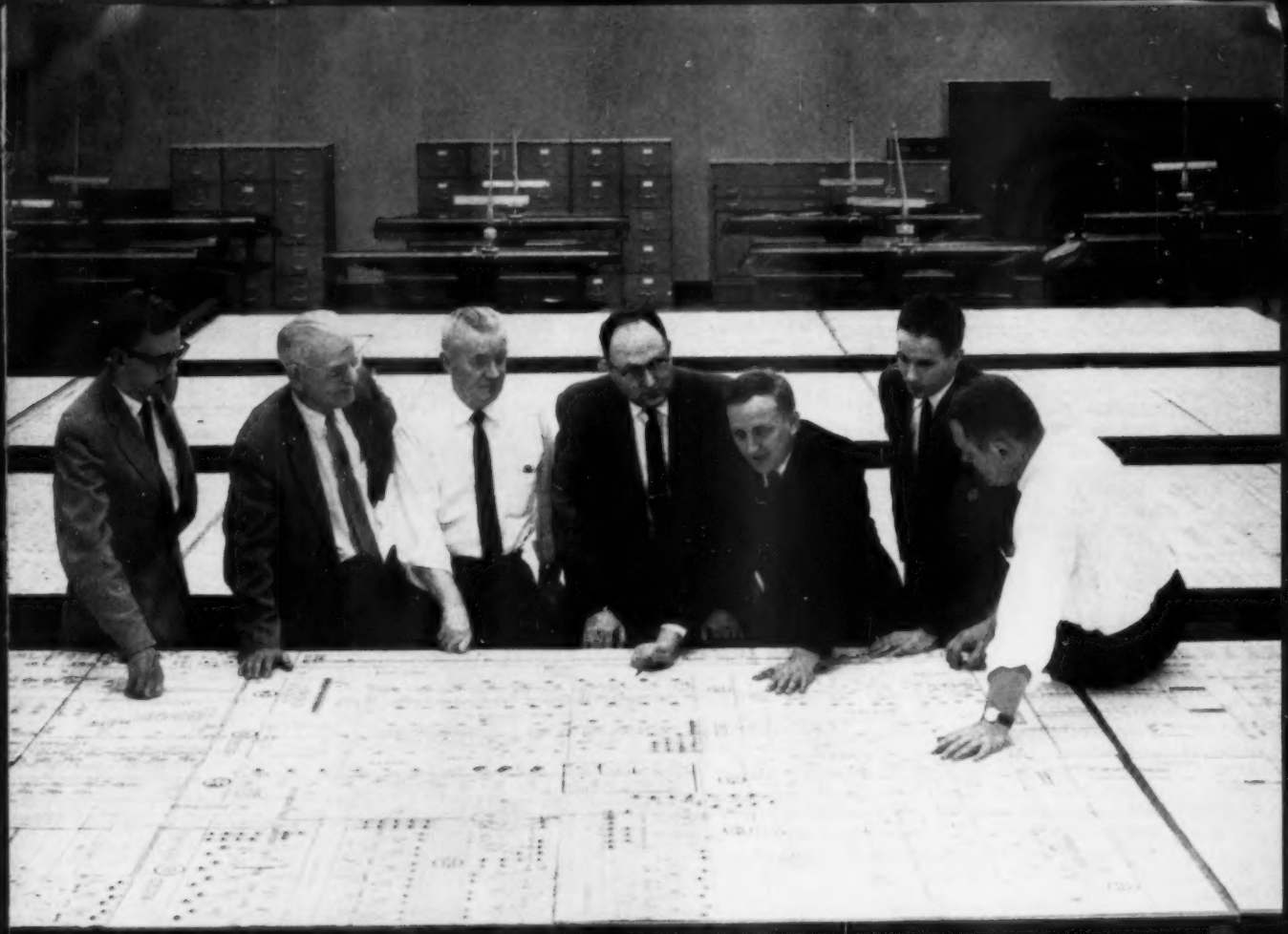
CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

Write for Booklet 2008

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7540 E. 290 ST. • WICKLIFFE, OHIO

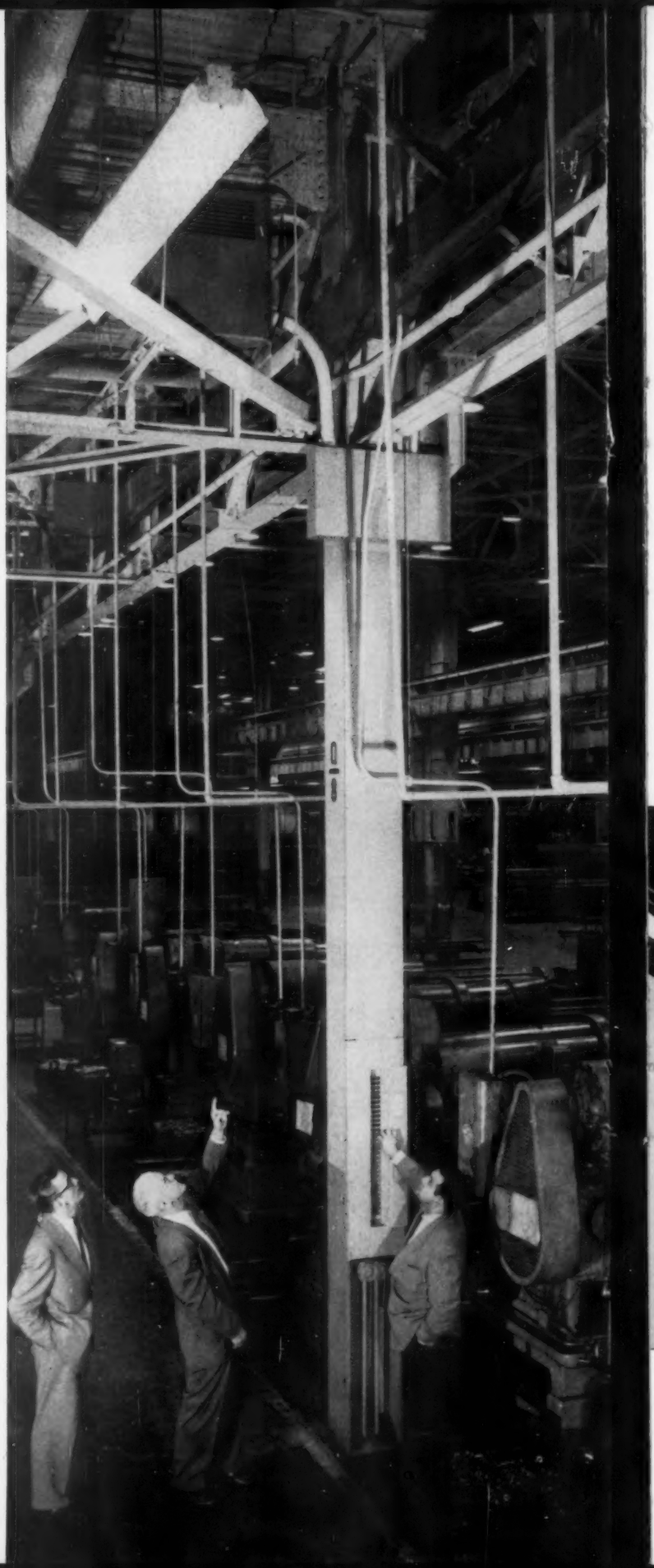
For more facts circle 506 on Reply Card



Westinghouse electrical system specified to Power-Up Ford products plant

YOU CAN BE SURE...IF IT'S Westinghouse

COVER PHOTO: Assembled in the plant layout room of the Ford Motor Co., General Products Division Plant, Indianapolis, Ind., are: Melvin Wetterlin, Westinghouse Sales Engineer, J. Vance Garinger, Project Engineer, Hatfield Electric Co., Inc., Electrical Contractors; S. V. Cornforth, Maintenance Engineer, Plant Engineering Department, Ford, Indianapolis; D. A. Kerry, Supervisor, Ford General Products Division Staff, Dearborn, Michigan; H. P. Jones, Manager, Plant Engineering Department, Ford, Indianapolis; James Miller, Westinghouse Construction Sales Engineer; and R. Richards, Supervisor, Engineering Planning, Plant Engineering Department, Ford, Indianapolis.



Melvin Wetterlin, J. Vance Garinger, and J. Rodriquez, Power and Waste Supervisor, Plant Engineering Department, Ford, Indianapolis, look overhead to identify the Westinghouse 45-kva DT-3 dry-type transformer, Westinghouse aluminum bus duct and Westinghouse fluorescent and high-bay lighting. Westinghouse NLAB-LX column-type panelboard, shown with trough and pullbox, is fed from the secondary of the dry-type transformer above.

Main entrance to Steering Gear and Cold Heading Plant, General Products Division, Ford Motor Company, Indianapolis, Indiana. Westinghouse electrical distribution system is used to meet present electrical needs, provide the necessary flexibility to permit extensive rearrangement of production machinery whenever required and to assure maximum facility in expanding to satisfy all future demands.

J-94104-2

Ford plant planning anticipates future power needs

The Ford Motor Company plant in Indianapolis, Indiana, where these pictures were taken, occupies more than 1,400,000 square feet of floor area. It requires a constant power supply of 26,500-kva. The combination of great size, large capacity and exacting, but frequently varying, production schedules makes it imperative that plant engineering must go beyond careful control of everyday operation. Planning for future demands becomes equally important.

Westinghouse, working with architects, consulting engineers, general contractors, electrical contractors and Ford engineers, had an active part in equipping this plant with the electrical distribution system and with other electrical components required to assure uninterrupted operation and provide for anticipated expansion. For example, 144 Westinghouse dry-type transformers of various ratings are mounted at heights varying from 22 to 45 feet above floor level, above conveyor trusses. The light weight, ease of installation and minimum maintenance requirements of these dry-type transformers have made it possible to locate them so each provides the required voltage, with minimum loss, to the equipment it supplies.

Over 6000 Westinghouse high-bay mercury vapor fixtures give daylight-type lighting in production areas, and these are supplemented by Westinghouse fluorescent lighting for the general illumination required by nighttime clean-up workers.

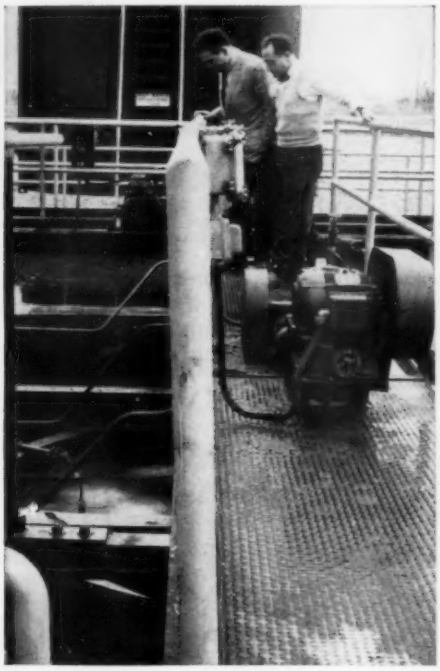
Approximately 2½ miles of Westinghouse 600-amp, 480-v, 3-pole, aluminum plug-in bus duct, mounted in 17 parallel straight runs (shown as

(continued)

J-94104-3

YOU CAN BE SURE...IF IT'S Westinghouse

J. Rodriquez checks substation meter to make certain power factor constant at 98% lag is being maintained throughout the plant. This extreme efficiency of the electrical system is made possible by the use of Westinghouse capacitors.



J. Rodriquez and W. D. Eason, Engineer, Waste Treatment Plant, Plant Engineering Department, stand beside Westinghouse 7.5-hp totally enclosed Life-Line® "A" motor which drives the waste oil recovery tank agitator.

Shown between Lloyd L. Williams, Branch Mgr., WESCO, Indianapolis, and Paul E. Butalla, Main. Supvr., Plant Engin. Dept., Ford, Indianapolis, is Westinghouse Slipsyn® synchronous motor starter providing automatic starting and field application control for Westinghouse 400-hp, 440-volt motor.

J. Vance Garinger, Lloyd Williams, C. E. Hamm, Sales Rep., WESCO, Indianapolis, and J. Rodriquez shown before one of the nine power centers which distribute the 26,500-kva load throughout the plant. Power centers have stand-by circuit breakers and blank cubicles equipped for future needs.

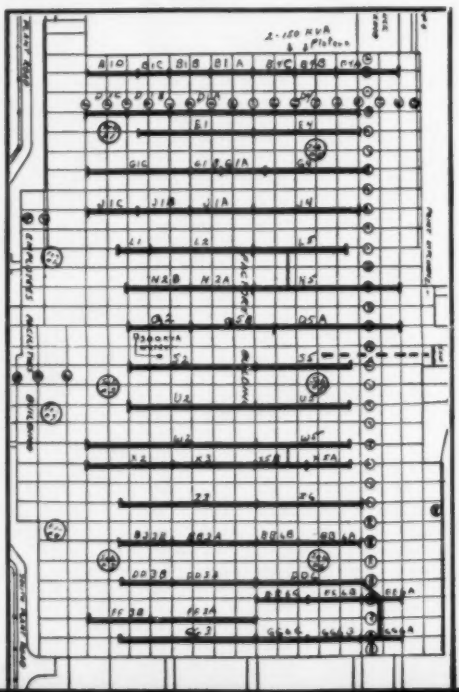
Ford plant planning anticipates future needs *(continued)*

heavy black lines in diagram), have been installed to provide maximum flexibility in locating production machinery.

Westinghouse can help you with any phase of your electrical planning and construction. See your Westinghouse distributor, or write Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pa.

Ford Motor Company
Steering Gear and Cold Heading Plant
General Products Division
Indianapolis, Indiana

Architect-Engineers: Smith, Hinchman and Grylls Associates, Inc.
Consulting Engineers: (Waste Treatment Plant) Hubbell, Roth & Clark, Inc.
General Contractors: Cunningham-Limp Co., Inc.
Electrical Contractors: Hatfield Electric Co., Inc.
Westinghouse Distributor: Westinghouse Electric Supply Co., Indianapolis, Indiana



YOU CAN BE SURE...IF IT'S Westinghouse

Over 250 Pages Westinghouse Data in Sweet's Construction File (S)

J-94104-4

For more facts circle 507 on Reply Card

"Full-round" design of Link-Belt LXS chain avoids stress raisers

ROLLERS are accurately machined for correct operating clearances and free-rolling action.

SIDEBARS of selected steel have accurately machined "full-round" pitch holes, which maintain firm, tight press fit of pins and bushings.

FOR POWER TRANSMISSION, LXS chain is generally supplied with offset sidebars. Uniform stress distribution provides extra chain life and safe dependable operation.

FOR CONVEYING AND ELEVATING, LXS chain with straight sidebars and rollers to meet varied operating conditions. A wide variety of attachments is available.

"FULL-ROUND" PINS are made from a tough steel, specially treated for high strength in shear . . . sized for controlled press fit to prevent rotation in sidebars.

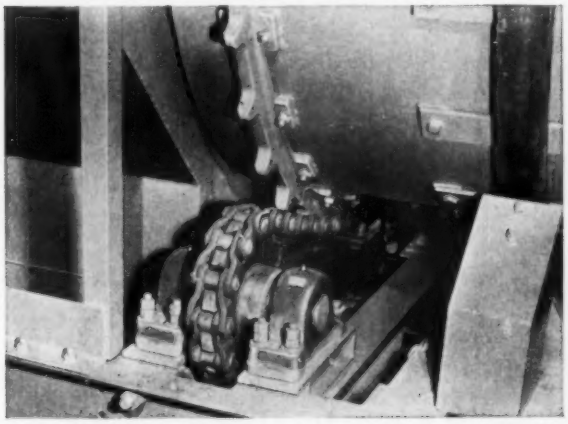
"FULL-ROUND" BUSHINGS are properly hardened to shrug off shock, resist wear . . . accurately sized for controlled press fit to prevent rotation in sidebars.

Greater live bearing area extends life

Stress concentration points are eliminated in Link-Belt LXS chain! "Full-round" design avoids sharp corners which may be the starting points of chain failure . . . provides maximum live bearing area between pin, bushing and sidebars. As a result, stress is distributed evenly . . . long chain life is assured under severe conditions.

Pins and bushings of LXS chain are accurately sized . . . assuring controlled press fits, preventing rotation in sidebars. Similar accuracy in machining of sidebars permits close control of pitch and proper chain length after assembly.

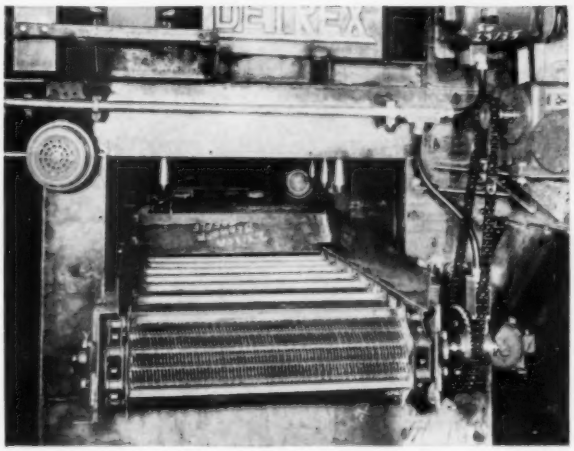
Other long-life features of Link-Belt LXS chain include use of selected steels and controlled hardening of all parts. Both contribute to greater endurance . . . greater uniformity.



LXS drives stand up to impact and abrasive service

Large, live bearing area makes LXS chain ideal for exposed drives and abrasive conditions such as found on this heavy rotating drum. Uniform distribution of load over ample bearing area reduces cutting action of abrasives . . . extends chain life.

LXS chain has stamina required for long, heavy-duty conveyors



With its exceptional strength and wear resistance, Link-Belt LXS chain can easily meet rugged conveying and elevating requirements. Due to accuracy of pitch and attachment spacing, plus close matching of multiple strands, LXS has the added strength and wear life necessary for the extra-long conveyors so important to today's highly mechanized industry.

HEADQUARTERS for chains, sprockets and other Link-Belt products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor. Refer to the Yellow Pages of your local Phone Directory.

LINK-BELT

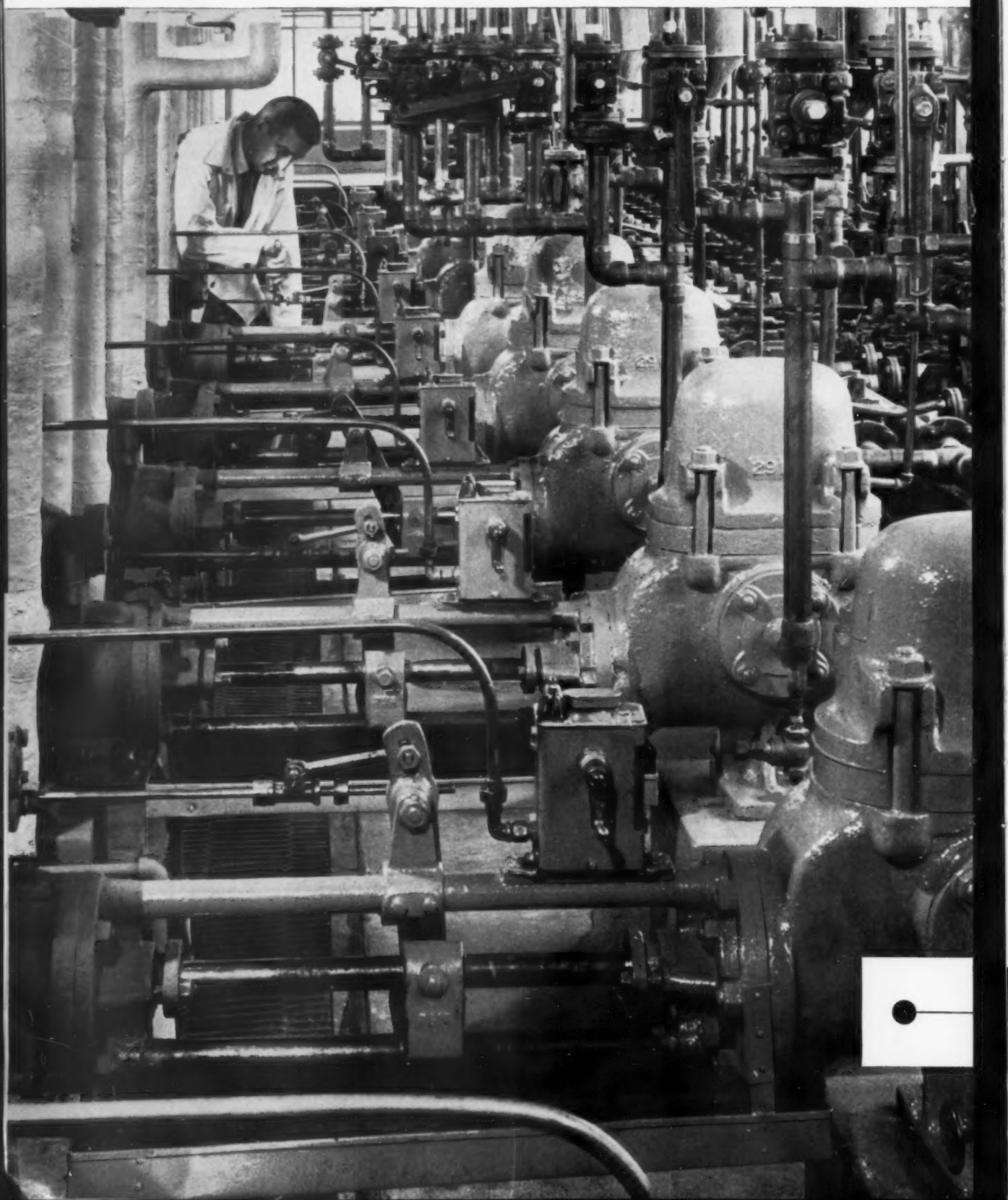
CHAINS AND SPROCKETS

14,740

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

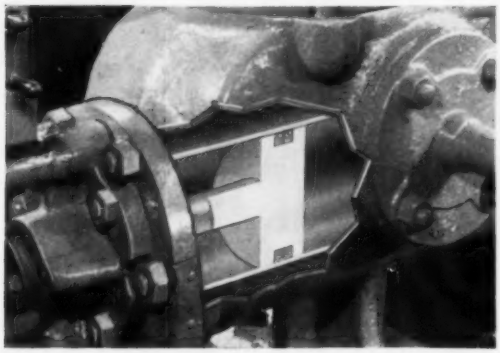
For more facts circle 508 on Reply Card

Garlock Lattice-Braid* Teflon† Packings help Kodak



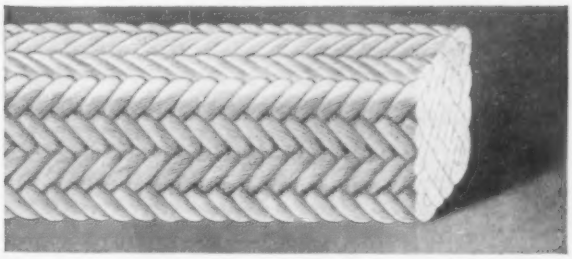
Recover 95% of Film Process Solvent for Re-Use

TODAY, at Eastman's Kodak Park Works in Rochester, Garlock LATTICE-BRAID Teflon packings are playing an important role in helping to recover, for later re-use, 95% of the solvents used annually in the coating of film.



DOING A JOB that neither rubber-impregnated canvas, duck, or other packings could do in the past, the LATTICE-BRAID Teflon packings provide tight seal up to 100 psi pressure in more than 100 pumps which move solvents from underground storage to various distilling operations where it's refined and prepared for use again. As part of the piston that furnishes pumping compression, the packings are constantly exposed to the solvent mixture and must be able to withstand its action without swelling or deterioration. In addition, the packings must create as little friction—and resulting wear—as possible on the cylinder liners while the piston moves at rates as high as sixty 12″ strokes per minute.

Garlock LATTICE-BRAID Teflon Packings have provided reliable service, without shutdowns for maintenance, as well as increased pump efficiency due to reduced slippage. There is also a lower coefficient of friction of packing to cylinder liner, while the liners themselves appear to remain in excellent condition.



LONGER OPERATING LIFE of both pump and packing lies in Garlock's use of Teflon yarn woven in lattice-braid construction. Each strand of Teflon passes diagonally through the body of the packing at an angle of approximately 45°. This through-and-through braiding makes a completely unified structure, resulting in greater strength. Garlock's LATTICE-BRAID has no outer cover to wear through; its through-and-through structure holds together when worn far beyond the limit of ordinary packings, resulting in longer packing life.

ADD to these features the fine physical properties of the Teflon yarn—chemical inertness, low friction coefficient, temperature stability, excellent cold-flow resistance—and you have the finest packing on the market.

LATTICE-BRAID Teflon Packing is another important part of "the Garlock 2,000" . . . two thousand different styles of packings, gaskets, and seals to meet all your needs. The only complete line. That's why your Garlock representative can give you unbiased recommendations. Call him or write for Folder AD-131.

*Registered Trademark
†DuPont Trademark

Ten of the reciprocating pumps used in solvent recovery at Kodak. Garlock LATTICE-BRAID Teflon Packings on the pump pistons have given satisfactory service since the first installation 2½ years ago.

GARLOCK

THE GARLOCK PACKING COMPANY, Palmyra, N. Y.
FOR PROMPT SERVICE, contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.

Packings, Gaskets, Oil Seals, Mechanical Seals, Molded and Extruded Rubber, Plastic Products

For more facts circle 509 on Reply Card

SKIL announces a big, new

DISC SANDER

TRADE-IN

Backing pad extra

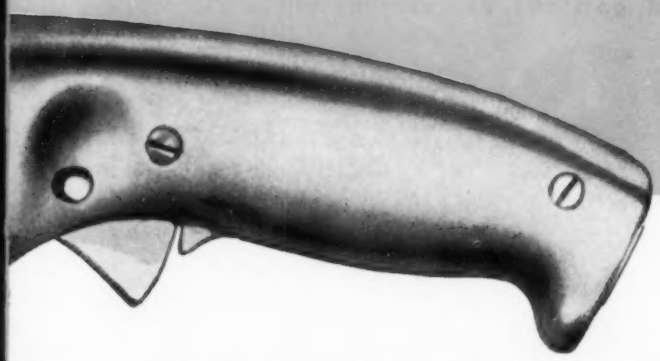
See your SKIL

money-saving

SALE

your tired old disc sander is worth a whopping

$13



Here's the deal!

	PRICE
New SKIL Model 852 or 853	$98.00
Less Trade-in Credit	13.00
YOU PAY ONLY	$85.00

Now is the time to retire your old, worn out disc sanders. Stop pouring money into repairs—just bring your old sanders to your SKIL distributor and he will give you a full $13.00 each on your choice of the new SKIL Model 853 or the Model 852.

This is the hottest deal on top quality disc sanders—you can't match it anywhere. And it's doubtful if it can be repeated. It's truly a sensational offer—and it's good only until December 31, 1958.

We don't care the make or condition of your old disc sander—it's still worth $13.00 when you buy the powerful, long-lasting SKIL Disc Sander.

No wonder the SKIL Disc Sander is so popular for sanding, wire brushing and grinding!

- spindle lock on front of housing cuts disc changing time to seconds
- forced ventilation gives efficient cooling and dust protection
- new, higher spindle speeds for higher maintained speeds under load . . . cuts job time
- die-cast aluminum housings for greatest possible strength with minimum weight
- precision spiral bevel gears with rubber cushioned gear mounting for quiet operation and a minimum of wear

distributor today and get in on this trade-in sale

SKIL

Made only by SKIL Corporation, manufacturer of famous SKIL and SKILSAW products, 5033 Elston Avenue, Chicago 30, Illinois

For more facts circle 510 on Reply Card

HOW BOWSER ESTABLISHED 1885 Liquid Handling SYSTEMS CUT COSTS

WITH AUTOMATIC CONTROL AND GREATER ACCURACY

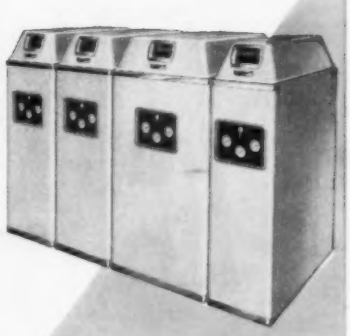
Automate your metering, batching or blending operation with a Bowser liquid control SYSTEM . . . and get these BENEFITS . . . lower initial investment . . . completely automatic control . . . unsurpassed accuracy . . . increased efficiency . . . single source of supply . . . and system performance guaranteed by Bowser, Inc.

Rate of Flow Controlling System

The Figure 417 Rate of Flow Controller is a completely self-contained system enabling fully automatic and accurate CONTROL of the rate of liquid in flow . . . to better than ¼ of 1% accuracy. Handles flow rates from ½ G.P.M. to 250 G.P.M.

Liquid Blending System

The Figure 413 Precision Blending System automatically and accurately blends two or more liquids in closed, continuous production. Accuracy within ¼ of 1% and completely automatic operation . . . assures uniform blend . . . reduces blending costs by 50%.

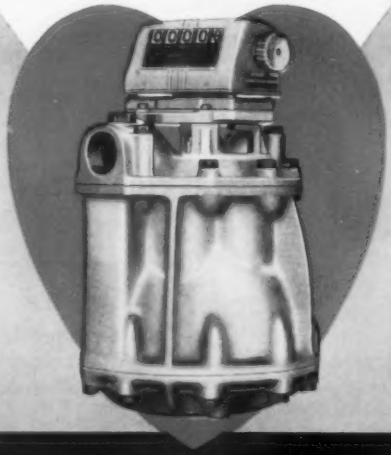


BOWSER METERS AND ACCESSORIES . . . offer complete systems for every type of liquid control requirement

MODEL L . . . straight-reading dial records liquid metered up to 100,000 gallons.

IMPULSE TRANSMITTER . . . transmits electrical impulses to a remote counter which records quantities, controls automatic batching.

MODEL K . . . Printing Dial provides printed records of quantities metered for inventory control, etc.



MODEL F . . . relays voltage signal to a remote flow indicator or controller permitting remote observation and control of the flow rate.

MODEL RP . . . automatically delivers repeated predetermined quantities of liquids.

REMOTE PREDETERMINING COUNTER . . . records electrical impulses from meter permitting automatic delivery and shutoff control for predetermined quantities.

XACTO METER . . . the HEART of Bowser liquid handling systems

Mail to BOWSER, Inc.

1327 E. Creighton Ave., Fort Wayne, Indiana

Please send complete information illustrating the many types of Bowser systems available.

NAME_____

TITLE_____

COMPANY_____

STREET_____

CITY_____ STATE_____

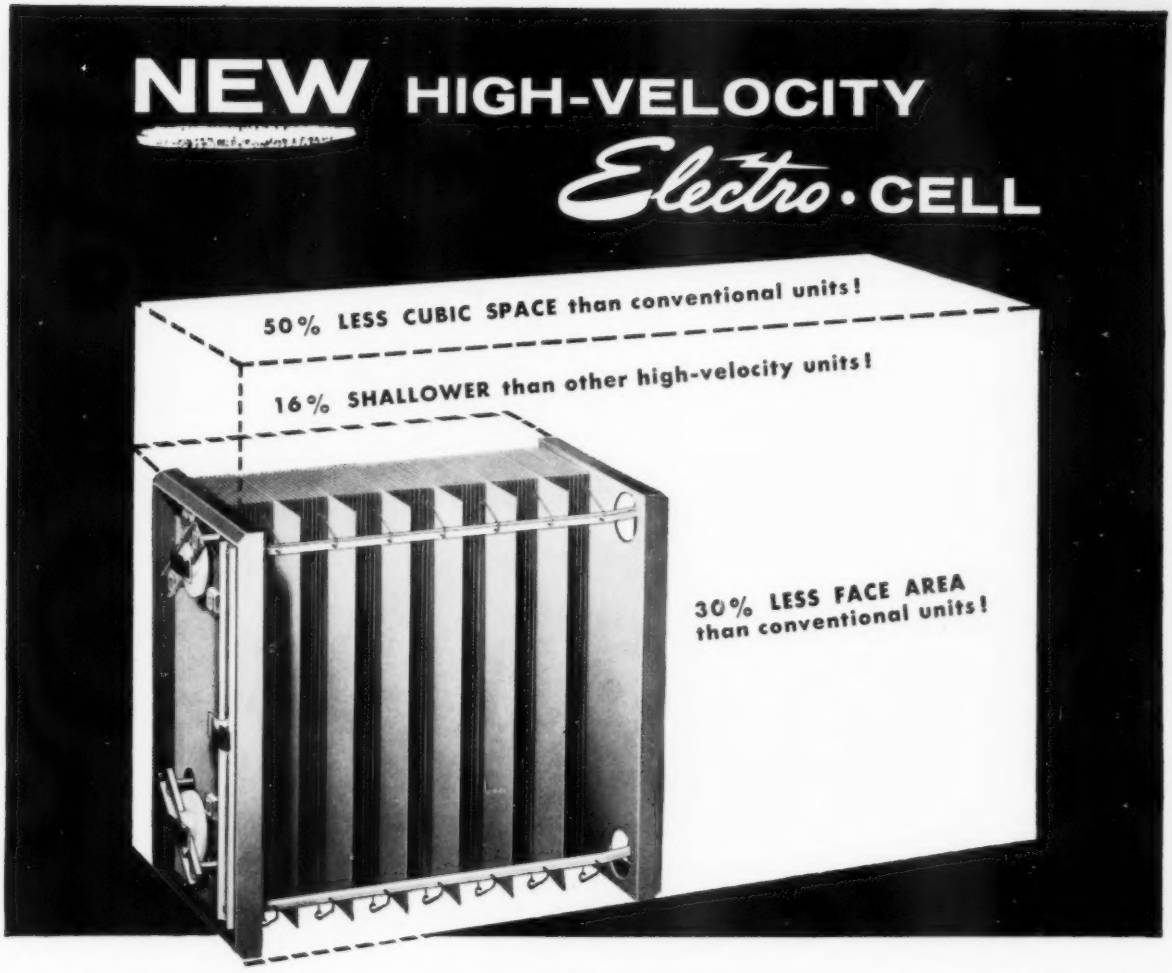
BOWSER ESTABLISHED 1885

XACTO . . . meters assure precision accuracy. Available in bronze, iron and all stainless steel construction.

Bowser's full line of meters, accessories and controls combine to offer you today's most automatic, economical and modern liquid handling systems.

For more facts circle 511 on Reply Card

NEW HIGH-VELOCITY *Electro*·CELL


50% LESS CUBIC SPACE than conventional units!
16% SHALLOWER than other high-velocity units!
30% LESS FACE AREA than conventional units!

Cleaner air... from a smaller package... at lower cost!

Just look at all the benefits built into AAF's brand-new Electro-CELL High-Velocity electrostatic precipitator:

CLEANER AIR — Efficiencies up to 97% are attained, at face velocities of 350 to 600 f.p.m., using the U. S. Bureau of Standards Test Method.

SMALLER SIZE — Design and installation problems are greatly simplified by these significant space savings: 50% lower cubic requirements, 30% reduction in face area as compared with conventional units. And 16% shallower than other high-velocity units.

LOWER COST — *Initial* costs of the Electro-CELL are lower because of reduced material requirements, simplified cell construction; *installation* costs are cut because of fewer collector elements, built-in electrical contacts to eliminate cell-to-cell wiring, and easier handling of the smaller unit. And the user gets the benefits of lowered power requirements, lower maintenance costs with *automatic* washer, long-life construction, and no-moving-parts operation.

Interested? See your nearest AAF representative, or write for Bulletin 258 for full details.

AAF American Air Filter COMPANY, INC.

228 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.

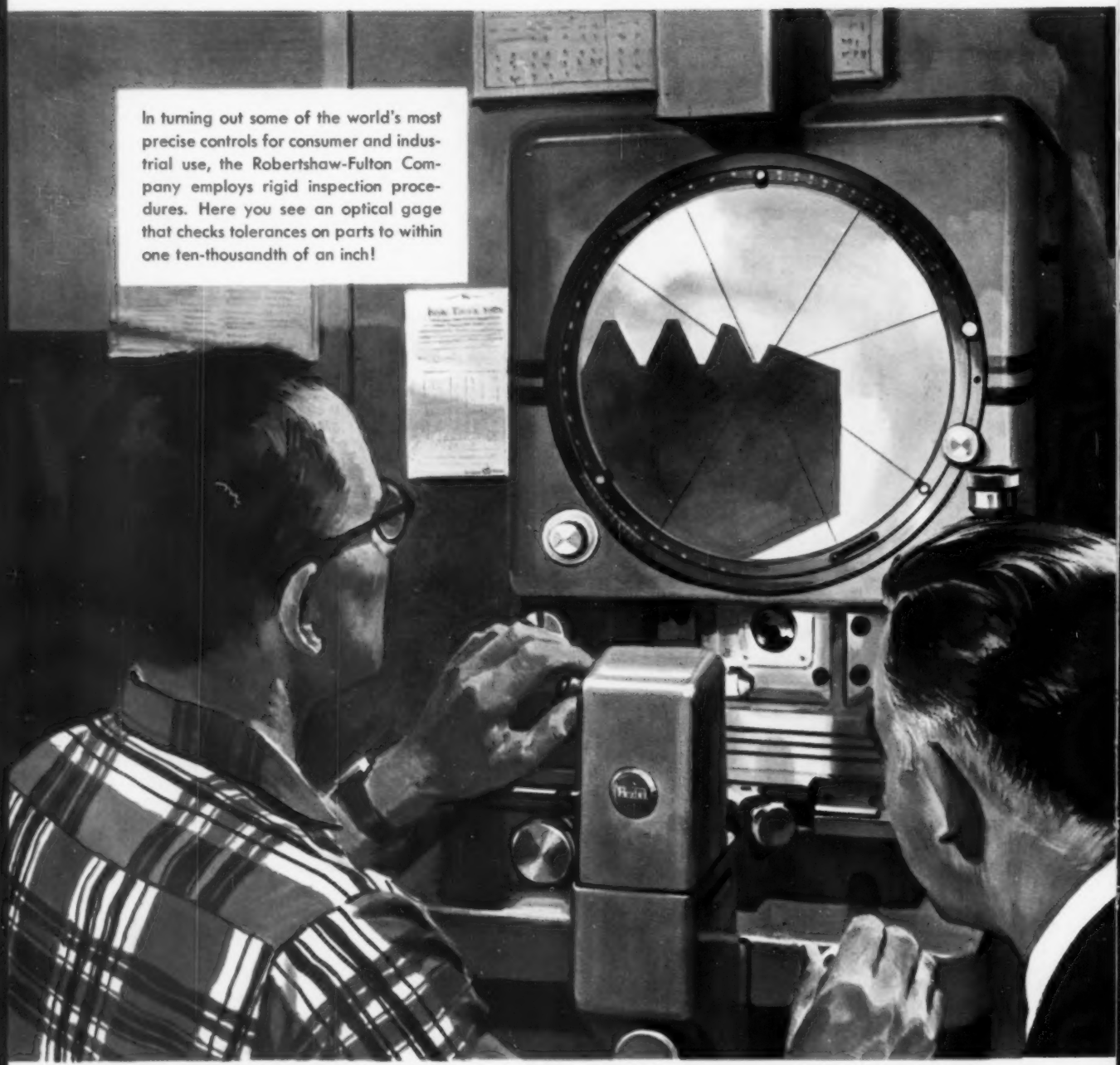
BETTER AIR IS OUR BUSINESS

For more facts circle 512 on Reply Card

For more facts circle 513 on Reply Card →

Correct Lubrication in Action...

How precision teamwork


In turning out some of the world's most precise controls for consumer and industrial use, the Robertshaw-Fulton Company employs rigid inspection procedures. Here you see an optical gage that checks tolerances on parts to within one ten-thousandth of an inch!

Mobil

Complete Engineering Program
Proved Petroleum Products

Mobil

SOCONY MOBIL OIL CO., INC., and Affiliates: MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP., MOBIL OVERSEAS OIL CO., INC.

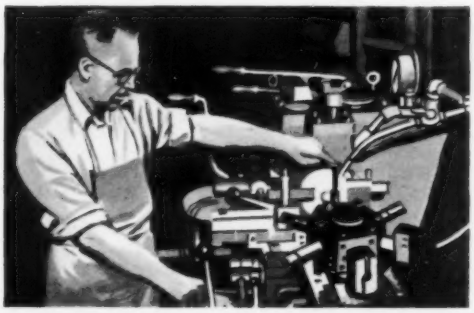
cut costs- saved $12,532

Here's how Robertshaw-Fulton Controls Company and Mobil cut maintenance costs in numerous ways!

"Miracles with metals!" That's the description for the precision controls produced by the Fulton Sylphon Division of Robertshaw-Fulton Controls Company in Knoxville, Tenn. To turn out these finely engineered products takes the utmost coordination between machines and men. Here's where *Mobil Correct Lubrication* comes in.

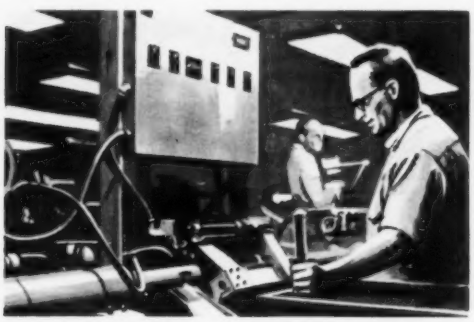
Mobil engineers and plant maintenance personnel work as a team to solve maintenance problems and keep production at a maximum. For example: Bearing failures on controlled atmosphere furnace caused occasional shutdowns. Mobil engineers and plant supervisors developed a special automatic lubricating system that solved extreme temperature problems. Result: *no more bearing replacements* . . . in a year, *$2,700 saved.*

Here is just one of many examples of *Correct Lubrication in Action.* Imaginative engineering . . . research . . . laboratories on call . . . more lubricating experience than any other oil company back up a Mobil Program in a plant. Why not specify Mobil for your plant?



Turret lathe heads weren't indexing properly at times, resulting in losses on machined parts. Lathe had to be serviced several times a week. Mobil and plant men pinpointed trouble in soluble oil emulsion. New formulation solved problem . . . saved $2,000 a year in repair costs alone.

Previously, it required stopping machinery while a man brushed lubricant from a 35-lb. pail onto gears. Now with new pressurized Mobilcote S dispenser application is quick . . . no interruption to production . . . consumption of gear lubricant cut 95%. And a more thorough job is done too!



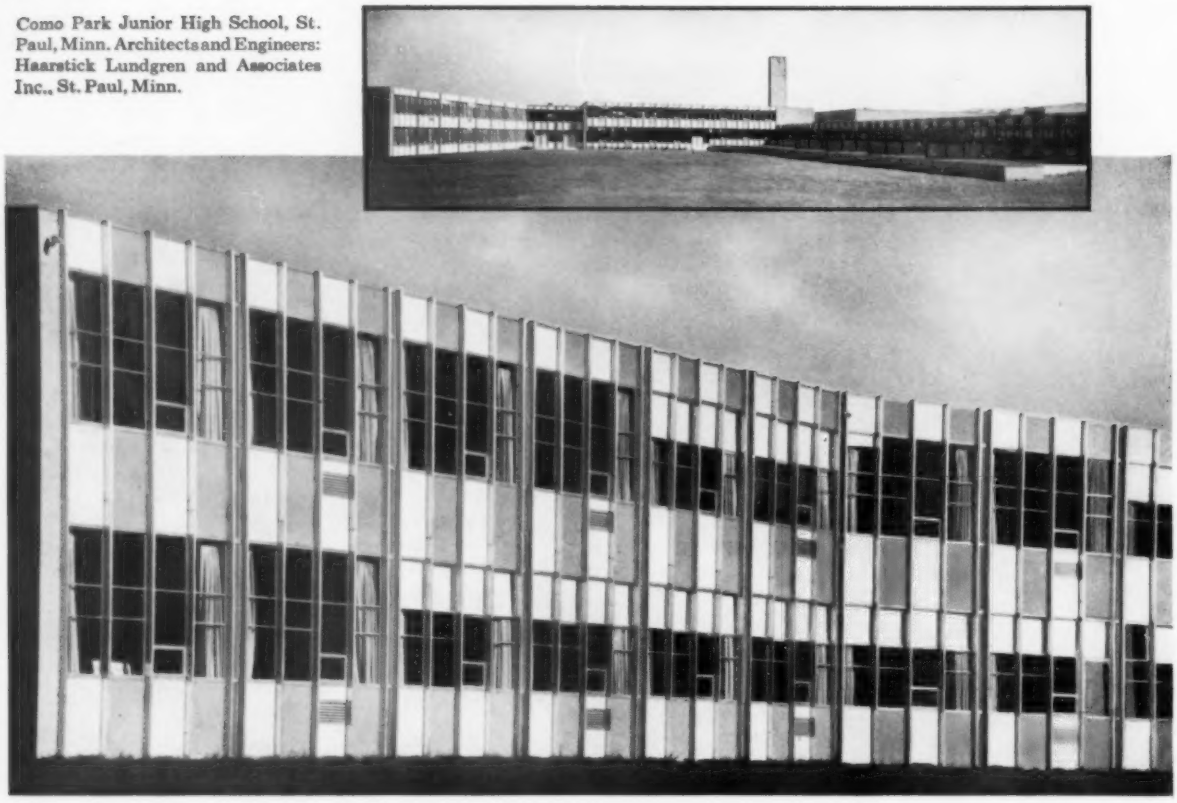
The four-way pilot valves on twenty-six hydraulic Corrugating Machines "froze" after shutdown over weekend . . . had to be disassembled and cleaned each time. Mobil analysis found trouble to be corrosion. Mobil recommendation eliminated trouble . . . saved $2,072 per year.

The thirteen Redraw Presses were eating up oil. Mobil and plant men devised system that included mechanical improvements . . . tightened hydraulic system . . . installed collecting pans and used portable oil filter. Result: 9,600 gallons of oil reclaimed . . . $5,760 saved annually.

Correct Lubrication

Another reason You're Miles Ahead with Mobil!

Como Park Junior High School, St. Paul, Minn. Architects and Engineers: Haarstick Lundgren and Associates Inc., St. Paul, Minn.



NOW! Johns-Manville TRANSITOP® building panels are PRE-PRIMED to take any type of paint finish

. . . provide unlimited color possibilities in economical curtain-wall construction

PRE-PRIMED Transitop panels give architects and builders new freedom in the use of color as an expression of decoration in both exterior curtain wall and interior construction.

The factory pre-primed coat, on both faces of Transitop panels, eliminates priming on the job, acts as a first face coat. J-M Transitop will accept any good grade of paint of any type or color. Labor and painting costs at the job site are reduced. A decorative color job is completed faster.

A variety of decorative effects are possible by combining painted Transitop panels with various shapes, sizes and finishes of spandrel- and mullion-type construction.

Johns-Manville Transitop is an insulating structural panel, consisting of an impregnated core faced on two sides with incombustible Asbestos Flexboard® sheets. The core of the impregnated insulating board cuts heat loss in winter, keeps the building cooler in summer.

Panels 4′ wide by 8′ up to 12′ in length speed construction, save on costs. Because Transitop panels weigh only 4.7 lbs. per square foot in 1-9/16″ thickness, they reduce the dead-load factor. This permits lighter framing and less expensive construction.

Find out more about how you can save on construction cost by using Transitop panels for insulated curtain walls, as free-standing or structural interior walls, for roof deck construction. For illustrated brochure "J-M Asbestos Transitop," write to: Johns-Manville, Box 158, New York 16, N. Y. In Canada, 565 Lakeshore Rd. E., Port Credit, Ont.

JOHNS-MANVILLE

For more facts circle 514 on Reply Card

no industrial gloom here

No ordinary coal hoppers these. Mobile Aluminum Paint will keep them looking new for years.

Boiler surfaces, structural beams, walls and stairways—everything is bright and clean with aluminum paint, made by **Mobile Paint Manufacturing Co.**, Mobile, Alabama.

New Barry Steam Plant Sparkles WITH MOBILE ALUMINUM PAINT

Good place to look at, good place to work in. That's how employees describe the new Barry Steam Plant, largest generating unit of the Alabama Power Company system.

Inside, one is struck by the uniform neatness and good lighting. Reason: management specified Mobile Aluminum Paint, made with ALCOA® Aluminum Pigment. Everywhere—on coal hoppers, boiler surfaces, structural members—reflective aluminum contributes to overall efficiency and economy.

Time-study men agree: better lighting increases work productivity. Aluminum paint reflects light, brightens any shop or plant. Aluminum-painted walls in hard-to-light areas can sometimes *double* the effective illumination from an existing light source.

Economical aluminum has exceptional hiding power. One coat covers old surfaces permanently—oil stains, old paint, tars or asphalt don't bleed through. And with aluminum, you can choose a warm, satiny surface or a gleaming chrome-like finish.

ALCOA does not make paint, but ALCOA Pigments are used in more aluminum paints than any other brand. Special formulas have been developed by paint manufacturers such as Mobile to solve individual problems. Paints made to these formulas actually cost less, last longer, give utmost protection against heat, cold, sun, rain, smoke and fumes.

Write today for our two free booklets, *Painting With Aluminum* and *Aluminum Asphalt Roof Coatings Make Time Stand Still.* Use the coupon.

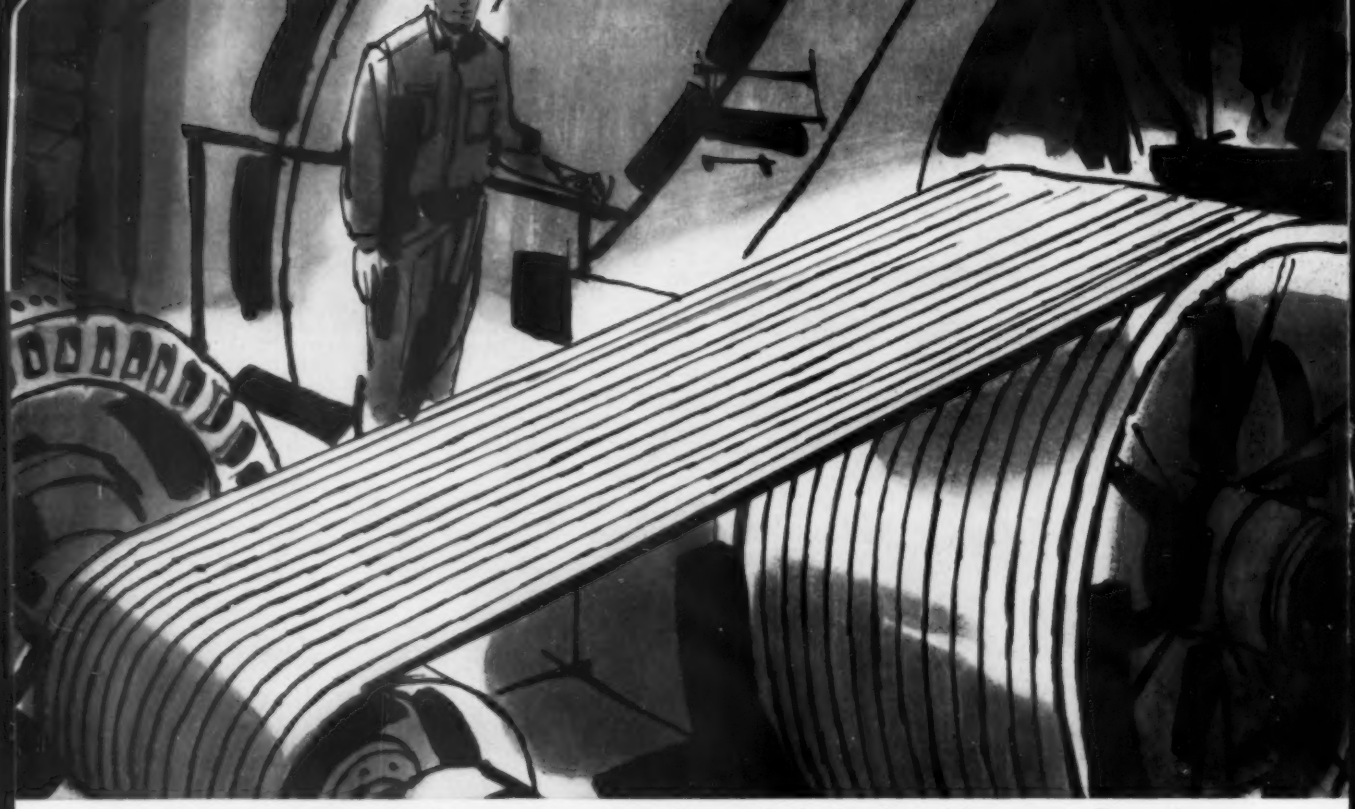
For more facts circle 515 on Reply Card

Look for this label when you buy aluminum paint

POWERED WITH ALCOA ALUMINUM

ALCOA THEATRE
Fine Entertainment
Alternate Monday Evenings

Aluminum Company of America
1790-K Alcoa Building, Pittsburgh 19, Pa.
Please send your free booklets:
☐ *Painting With Aluminum*
☐ *Aluminum Asphalt Roof Coatings Make Time Stand Still*
I am interested in protecting_____
Name_____
Company_____
Address_____
City_____ Zone____ State_____



Neoprene transmission belts keep power moving smoothly on all kinds of mechanical drive systems. They endure shock-loading, withstand high-speed flexing, and resist heat and oil. Result: they often outlast other belts 3 to 1.

You can cut costs all down the line with rubber products of neoprene or Hypalon®

Conveyor belts of neoprene keep rolling in spite of heat, fats, oils, grease. Outdoor exposure won't reduce their life expectancy. HYPALON is used for hot materials.

Neoprene steam hose stands up to high temperatures. Traces of oils and chemicals have negligible effect, won't cause rapid deterioration.

Acid hose gives longer service when it's lined with HYPALON for strong oxidizing chemicals or neoprene for most other chemicals. As covers, both resist wear and weather.

They give more service per dollar . . . they reduce maintenance costs . . . they minimize downtime

Whether it's transmission belts or conveyor belting, gaskets or hose, Du Pont neoprene and HYPALON offer job-fitted properties that mean extra durability in many plant applications.

Here are just a few typical performance records: V-belts that outlast ordinary belts 13 to 1 on circulating fans . . . cotton gin drive belts that outlast ordinary rubber belts 2 to 1 despite exposure to frictional heat and lubricating oil . . . in a steel casting plant neoprene conveyor belting carried molten sand and sharp metal fragments for one year without a shutdown; previous belts had lasted only 90 days . . . neoprene gaskets that resist sewage, salt water, severe compression on a municipal sewer line. An example of neoprene's versatility: general-purpose hose that can do the jobs of 4 separate special-purpose hoses to carry air, steam, oils, chemicals.

On-the-job results like these are typical of what you can expect from neoprene maintenance products. With its unmatched combination of properties, neoprene is capable of withstanding more deteriorating influences than any other rubber. After 23 years of outdoor exposure, for example, one sample of neoprene is still resilient, strong and crack-free. Neoprene also offers good all-around resistance to oil, grease, many chemicals, abrasion and flexing.

HYPALON, a newer Du Pont synthetic rubber, gives similar results under severe, specialized conditions. Its excellent resistance to strong oxidizing chemicals, oxidation-aging, abrasion and high temperatures is instrumental in the improved performance of hot materials belting and hose. In addition, HYPALON is completely ozone-proof.

The long-lasting performance of neoprene and HYPALON is available in many rubber maintenance products carried by your local rubber goods distributor. He can suggest the right product for your applications and offers quick delivery of small or large orders. Take advantage of his convenient services by calling him soon. For more information on the uses and properties of neoprene and HYPALON, write for *Du Pont Elastomers in Industry* to E. I. du Pont de Nemours & Co. (Inc.), Elastomer Chemicals Dept. PL-10, Wilmington 98, Del.

Du Pont synthetic rubbers do more things better . . .

NEOPRENE • HYPALON®

DU PONT

REG. U. S. PAT. OFF.

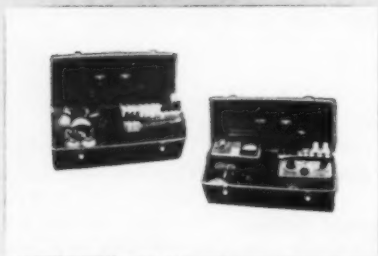
Better Things for Better Living . . . *through Chemistry*

For more facts circle 516 on Reply Card

NALCO BRINGS THE LABORATORY TO YOU...

Walking water lab.—a Nalco Representative can make a tremendous number of on-the-spot tests with equipment he always has with him.

Accurate, complete in-plant Nalco tests close the gap between water problem diagnosis and successful treatment.



Nalco Portable Labs are designed for use by Nalco people, whose testing problems range across the entire field of water treatment.

SOME TYPICAL TESTS EVERY NALCO REPRESENTATIVE CAN MAKE IN YOUR PLANT

ALKALINITIES / CHLORIDES / HARDNESS / PHOSPHATE (ORTHO & POLY) / DISSOLVED SOLIDS / IRON
OXYGEN / pH / ALUMINA / SILICA / CHROMATE / SULFITE / SULFATE / COAGULATION / FREE CO_2

Most water treatment problems you are likely to encounter can be solved right in your plant—thanks to Nalco's unique portable laboratories, used by your highly mobile Nalco Representative. And, of course, he has all the facilities of the Nalco main laboratories to call on for special analyses—suspended solids, manganese, or even radio activity.

Putting the facilities and skills of the world's largest water treatment organization right in your plant saves valuable time, speeds putting effective water treatment to work, and gives quick answers to meet changing water or operating conditions.

Right now is the best time to get an expert appraisal of your water treatment by your Nalco Representative. Call or write today.

NATIONAL ALUMINATE CORPORATION • 6273 WEST 66th PLACE • CHICAGO 38, ILLINOIS

CANADA: Alchem Limited, Burlington, Ontario • NORTHWESTERN UNITED STATES, HAWAII and ALASKA: The Flox Company, Inc., Minneapolis 3, Minnesota
ITALY: Nalco Italiana, S.p.A. • GERMANY: Deutsche Nalco-Chemie GmbH • SPAIN: Nalco Espanola, S.A.

THE *Nalco*® SYSTEM...

SERVING WORLD INDUSTRY THROUGH PRACTICAL APPLIED SCIENCE

For more facts circle 517 on Reply Card

BULLETINS just released and of immediate plant interest

Reader Service Cards for ordering bulletins are on pages 211-212. Be sure to include your name, job title, and company, even if you want bulletins mailed to your home address.

LIGHTING, COMMUNICATION

101 Simplified Relamping—This 16-pp booklet describes a simplified relamping plan which enables users to predict with reasonable accuracy when the lamps they are using have reached the end of their economic life. It also spells out the comparatively heavy costs involved in replacing one lamp at a time. General Electric Co.

102 Lighting Specifications—This 32-pp priced catalog covers lighting equipment for industrial and other applications. Various types of lighting fixtures are illustrated and described, and detailed specifications and dimensional drawings included. Accessories are also listed. Luminous Ceilings Inc.

103 Mercury Floodlights—Bulletin GEC-1486, 8 pp, describes mercury vapor floodlights for parking lots, outdoor work areas, loading docks and similar areas. Heavy-duty, general purpose, and general-area floodlighting units from 100 to 1000 w are discussed. Also provided are application data, details of mounting methods, dimension drawings. General Electric Co.

104 Closed Circuit TV—Twelve-pp Bulletin 2239 describes company's major types of industrial television equipment, gives five basic suggestions for equipment selection, and illustrates each with case histories of successful uses. Diamond Power Specialty Corp.

ELECTRICAL

105 Wound Rotor Motors—Bulletin GEA-6713 describes wound rotor motors for crane or general industrial applications. Cutaway view shows internal construction. Ratings and dimensions are tabulated. General Electric Co.

106 Textile Motors—Eight-pp Publication GEA-6818 describes company's Tri-Clad '55 motors in 1- through 5-hp ratings for use on looms, roving and spinning frames, warping, twisting and carding machines, others requiring reliable electric drives. Contains rating and dimensional data in tabular form. General Electric Co.

107 Substation Transformers—Comprehensive information on transformers used in company's unit substations is given in 12-pp Bulletin 5804. Provides both ratings and construction details on various transformer types available. A section on primary devices—terminal chambers, circuit breakers, interrupter switches and for roof bushings—is included. Transformer & Rectifier Div., I-T-E Circuit Breaker Co.

108 Secondary, Service Cable—Bulletin RCP-361, 8 pp, on neutral-supported secondary and service drop cables, provides specifications for both types, including scope of use, conductors, insulation, construction, tests and put ups. Charts show number of strands, insulation thickness, size and type of messengers, current carrying capacity. Rome Cable Corp.

110 Step Voltage Regulators—Bulletin GEA-5752D, 12-pp, illustrated, describes features and gives application data on company's redesigned single-phase step voltage regulators for pole or station installation. Control diagrams, switching connections, dimensions, and weights are given for 23 ratings from 11.4 to 250 kva in five voltage classes. General Electric Co.

111 Motor Control Centers—Bulletin GEA-4979D, 12 pp, provides detailed descriptions of company's line of industrial motor centers in NEMA Sizes 1 through 6, applicable to all industries where two or more a-c and/or d-c motors can be controlled from a central location. Describes features of equipment, provides data on minimum space requirements, includes planning charts, and provides sample specifications. General Electric Co.

112 Control Centers—Bulletin 402, 16 pp, describes features and advantages of motor controls centralized by Concentrol—with complete interchangeability of units and wire accessibility, front and rear. Suggested layout patterns are given, as well as dimensional tables and specifications. Continental Electric Equipment Co.

113 Improved Switchgear—Bulletin GEA-5664E is 40-pp booklet on the operation, characteristics and application of manufacturer's indoor and outdoor Metal-clad switchgear, rated 2.4 to 13.8 kv with interrupting capacities of 75 to 1000 mva. Describes Metal-clad's margins of versatility, system protection, safety, compactness, maintenance and ordering ease. Includes equipment and application photos, dimensional drawings and lists of basic equipment. General Electric Co.

114 Rotary Multipole Switches—This 20-pp catalog covers company's line of rotary multipole switches, including standard tap, transfer, and selector switches. Photos, dimensional drawings, engineering data, electrical ratings, circuit and contact diagrams, and instructions for ordering special switches are included. Electro Switch Corp.

115 Time Switches—Bulletin GEA-6681, 12-pp, describes in text and pictures company's Types TS-40, TS-41 and TS-47 time switches. Includes specifications, pricing, dimensions and ordering instructions, design features, and applications. General Electric Co.

116 Aluminum Rigid Conduit—This 12-pp booklet outlines briefly the mechanical and electrical advantages of aluminum rigid conduit. Specific installation instructions are included, as well as table of dimensions and weights. Aluminum Co. of America.

117 Industrial Truck Batteries—Bulletin IT-528 contains 12 pp of details on a line of rider and hand truck batteries. It covers plate and cell construction, weights, sizes and tray arrangements. C & D Batteries, Inc.

VALVES AND FITTINGS

118 Industrial Valves—Condensed Catalog CD-2, 28-pp, describes most of this manufacturer's industrial valves, and includes sections devoted to bronze, iron, cast steel, forged steel valves and accessories. Valve figure numbers are indexed for finger-tip reference by topics; face-to-face dimensions are supplied. A comparison chart offers quick cross reference to commonly used figure numbers of ten valve manufacturers. The Ohio Injector Co.

119 Cushioned Valves—Nine automatic water control valves and their uses are described in 8-pp Bulletin G-5A. Featured are cushioned check valves, water level control valves, sensitive pressure regulators and one-man control valves. Photos of typical installations are included. Golden-Anderson Valve Specialty Co.

120 Air Valve—A high velocity air valve, composed of gang operated, Neoprene vane sections is described in 8-pp Catalog F-8752. Engineering data, dimensional, descriptive and application information is included. Barber-Colman Co.

121 Servo-Valves—Catalog 210 contains a series of curves and schematics which highlight the design and performance characteristics of company's low flow servo valves. A detailed glossary of terms as well as cutaway photo of typical valve in the series are included. Moog Valve Co. Inc.

122 Hard Rubber Fittings—Eight-pp Bulletin PF 1300 describes hard rubber pipe fittings and valves, including natural hard rubber and synthetic rubber. In addition to general information regarding characteristics and handling, folder consists of diagrams and dimensions of threaded fittings, check valves, pet cocks, bibcocks and many types of valves. Luzerne Rubber Co.

INSTRUMENTS, CONTROLS

123 Automatic Controls—Catalog 26 comprises 52 pages which describe and illustrate electric thermostats, pressure controls, humidistats, motor-operated valves, temperature regulators, motor operators, unit ventilator controls, hot water controls, electronic controls, control centers and accessories. Operational and application data is incorporated with the description of each control component. Barber-Colman Co.

124 Propeller Meters—Twenty-pp Bulletin 314-1 covers propeller meters and other water measurement and recording instruments. Some of the principles of propeller metering are presented along with performance graphs of each type. Recorders and their application, remote controlling are also discussed. Sparling Meter Co.

BULLETINS

(Begins on page 25)

125 Process Instrumentation—Representative items from a wide line of process instrumentation and equipment are described in 8-pp Bulletin 100-R5. Contains photos, operational data, and design feature descriptions of twelve varied products for positive control of materials in motion, including flow tubes, telemetering, supervisory control, butterfly valve, valve positioners, others. Builders-Providence, Inc., Div. B-I-F Industries, Inc.

126 Flow Regulators—Catalog 1000, 16 pp, describes a line of pressure-compensated flow regulators for hydraulic power systems. Sectional illustrations and dimension drawings are given, together with orifice-flow chart, other data. Waterman Engineering Co.

127 Liquid Level Gages—Condensed Catalog 335 contains 8 pp of information on standard and special function gages and valves. Illustrated with photos and drawings, it includes dimensional drawings, construction features, pressure-temperature graphs and ratings, materials, tables of sizes, specifications and standard and optional features. Jerguson Gage & Valve Co.

128 Temperature Detectors—Information on Company's Thermohm detectors (resistance thermometers) for temperatures to 1000 F is offered in 36-pp Catalog EN-S4. Tells how these primary elements are used in chemicals, food and drugs, glass, metalworking, petroleum, steam and power engineeration applications. Fully illustrated, catalog lists Thermohm specifications by application. Leeds & Northrup Co.

129 Photoelectric Systems—This 24-pp brochure contains detailed specifications, descriptive data, operational charts and a concise selector guide for photoelectric systems for control applications. These include long range protection against intrusion, counting, sorting, inspecting, precision registration and high-temperature measurement. Also described are miniature and sub-miniature photoelectric receivers and light sources. Photoswitch Div., Electronics Corp. of America.

130 Pipeline Sampling—Precise, automatic methods of sampling directly from pipelines are described in 8-pp Bulletin SM 9475-2. Illustrated, bulletin describes technical aspects such as line stratification, flow profile, sample probe location, economic factors, and both time-proportional and flow-proportional sampling. Proporitoneers, Inc.

131 Double Duct Control—Catalog F-8753 describes a double duct mixing unit with a self-contained constant volume control which delivers constant cfm while mixing hot and cold high velocity air and reducing it to conventional velocities at minimum noise level. Engineering data, dimensional and application information included. Barber-Colman Co.

132 Ion Exchange Controls—Six-pp Bulletin E-156 describes automatic controls for ion-exchange equipment. Various elements in the control cabinets, as well as all the power-operated units, are covered and construction features detailed. Specifications are included. Illinois Water Treatment Co.

PUMPS, COMPRESSORS

134 Centrifugal Pumps—Bulletin 721.6, 16 pp, describes single stage, double suction centrifugal pumps with horizontally split cases, available with grease- or oil-lubricated bearings, and offering standardization and interchangeability of parts. Bulletin provides specifications, sectional views, and chart of materials of construction, and parts interchangeability. Includes performance curves. Goulds Pumps, Inc.

135 Low Pressure Compressors—Eight-pp Bulletin A-95 describes a line of low pressure compressors for heavy duty industrial applications. Engineering design features are detailed and advantages explained. Joy Mfg. Co.

136 Medium Pressure Compressors—Bulletin LAH-158 presents Spiraxial compressors in capacities from 1000 to 12,000 cfm for pressures to 15 psig, giving design and construction data as an aid to selection and application of this equipment in many process industries. Ratings and capacities for 17 sizes are listed. Roots-Connersville Blower, Div., Dresser Industries, Inc.

FANS AND BLOWERS

137 Industrial Fans—Bulletin I-585, 16 pp, describes company's industrial fans, and includes construction features, applications, fan arrangements and selection information. Temperature and altitude selection data, capacity tables, dimensions, special arrangements and types of fans are listed. The Day Co.

138 Rotary Blowers, Pumps—Full details on continuous-service rotary positive pressure blowers, gas and vacuum pumps are included in 20-pp Bulletin S65C. Contains photos and cutaway drawings showing construction features, as well as explanation of operating principles and a list of typical applications. Sutorbilt Corp.

139 Rotary Positive Blowers—Eight-pp Bulletin AF-258 describes operation and construction features of company's rotary positive blowers. Detailed design and construction information is presented together with technical data to aid in proper selection and application of this equipment in a wide range of process industries, for vacuum or pressure. Roots-Connersville Blower, Div. Dresser Industries, Inc.

MATERIALS HANDLING

140 Coordinated Handling—How company's equipment solves handling problems in business and industry is told in this 43-pp handbook—Bulletin GC-58. Incorporated are on-the-job photos, explanations and drawings which point up specific uses of the conveyors and special-accessory equipment. Catagories cover principles of a coordinated system, gravity conveyors, power conveyors, live storage conveyors, overhead conveyors, special use conveyors, industrial conveyors, accessories, casters, wheels and hand trucks. The Rapids-Standard Co., Inc.

141 Conveyor Systems—Catalog 856 contains 32 pp of illustrative material and data on conveyor systems for a variety of industrial applications. Among equipment pictured are roller conveyors, wheel conveyors, belt conveyors, live roller conveyors, chain conveyors, overhead trolley conveyors, elevating conveyors, sheet metal and roller spirals, portable power conveyors, ball transfers, special conveying machinery. Mathews Conveyer Co.

142 Wire Rope Conveyor—Bulletin 948, on wire rope type belt conveyors, describes advantages of this system of moving materials at low cost. Illustrations show types of carrying idlers, type of rope stands with return idlers and installations. The Jeffrey Mfg. Co.

143 Vibrating Conveyors—Sixteen-page Catalog 66 is designed as a selection guide on vibrating conveyors for bulk materials. Gives information on materials handling operations that can be performed simultaneously while conveying, flow charts, illustrations of different types of applications, capacities, dimensions, and other selection data. Ajax Flexible Coupling Co. Inc.

144 Package Conveyor Belts—Featured in this illustrated data sheet are package conveyor belts with ribbed design for "Griptite" belts, self-cleaning and designed for use with packages ranging from heavy to lightweight. B. F. Goodrich Industrial Products Co.

145 Hand Traveling Cranes—Bulletin DH-468-A describes a hand traveling crane for applications where accurate spotting is more important than fast travel. Lists lifting capacities in tons, widths of spans in feet, specifications and general features. Wright Hoist Div., American Chain & Cable Co., Inc.

Postage-free Reader Service Cards make it easy to order bulletins. Cards are provided on pages 211-212

146 Crane Components—General Catalog 58 A, 64 pp, features detailed information on hoists, cranes, and crane components. Profusely illustrated with photos, drawings and diagrams, the manual covers end trucks, Gard-Elex enclosed conductors. Load Tamer hoists, crane drives and fluid drive motors, trolleys, runway rails, hangar fittings, and other components for building top riding and underslung cranes from 1- to 15-ton capacity. Consolidated Crane & Engineering Corp.

147 Floor Trucks—Circular 29-D is a 6-pp presentation of four-wheel floor trucks for a variety of special and standard materials handling jobs. Included are trucks with replaceable wooden decks, roller platforms, V-type decks, removable end and side racks, spring-loaded decks and steel shelving. Lewis-Shepard Products, Inc.

(More Bulletins on page 213)

let's take a second look at air compressor costs

Let's look at what Joy compressors have to offer in saving you money where it counts the most. Let's assume that all compressors are competitively priced . . . and go on from there.

eagle-eye the installation first . . . here's where specifying Joy saves a bundle. Why? Because Joy stationary compressors are "Packaged" units. They're shipped complete, ready to run without tedious, costly site assembly. Joy compressors need as little as one-half as much foundation. You can save up to $1000 on that item alone.

plus savings in maintenance . . . *All the wearing parts:* the cylinder liners, cross head guides, valves, etc., are replaceable at your plant, by your men. This is a Joy exclusive. No specialists needed, no fancy tools required. Joy engineered these compressors to run for years on minimum maintenance.

and on operation, we'll let the people who have used Joy compressors for years do our telling for us. Nope—no modesty . . . but the money they've saved in operating costs annually would sound unbelievable coming from us.

If you're frowning over the choice of your next compressors and what to do to save a needed buck . . . . . .

Take a second look and get in touch with a Joy Engineer. He'll show you how Joy saves you money on air. Write Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario.

WSW 1 7165-243

WRITE FOR FREE BULLETIN 243-15

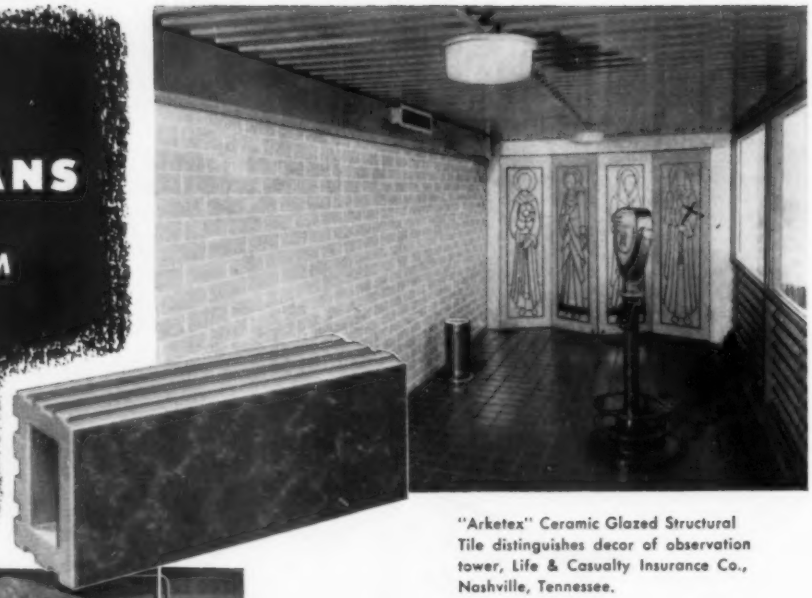
JOY SAVES YOU MONEY ON AIR

COMPRESSORS • FANS • DUST COLLECTORS

For more facts circle 518 on Reply Card

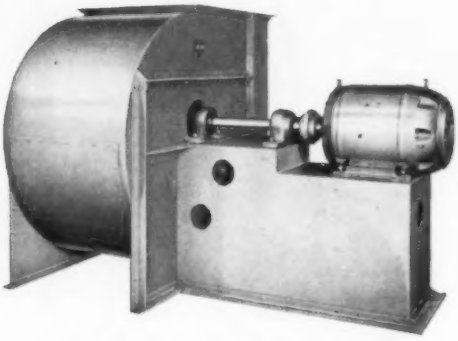
HOW Bayley FANS

RECIRCULATE WARM AIR FOR DRYING Arketex CERAMIC GLAZED STRUCTURAL TILE



"Arketex" Ceramic Glazed Structural Tile distinguishes decor of observation tower, Life & Casualty Insurance Co., Nashville, Tennessee.

Bayley Fans recirculate warm air for clay products dryers in plant of Arketex Ceramic Corp.



Bayley 445 Fan similar to type employed in "Arketex" ceramics plant.

IN the progressive-type dryer required for drying the high quality ceramic glazed structural tile produced by the makers of "Arketex," it is essential to properly control both temperature and humidity. A battery of six Bayley Fans are employed in the modern plant of Arketex Ceramic Corporation, Brazil, Indiana, for re-circulating warm air in clay products drier.

Choice of Bayley Fans for this process at "Arketex" is a reflection of confidence on the part of both dryer designer and the purchaser in the efficiency of Bayley equipment. You may always rely upon Bayley specialists to recommend the right answer to your air-handling requirements.

Illustrated Bulletins upon request.

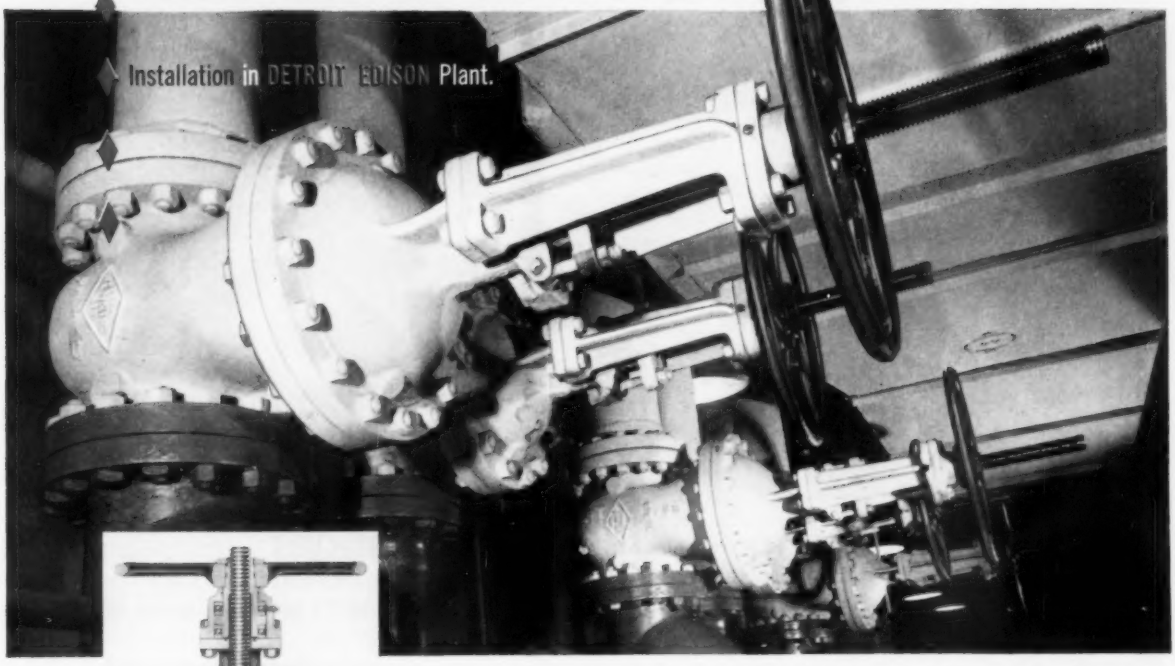
Bayley BLOWER COMPANY

1825 South 66th Street — Milwaukee, Wisconsin

For more facts circle 519 on Reply Card

where they really know Costs

—you'll likely see the famous Jenkins mark on CAST STEEL Valves



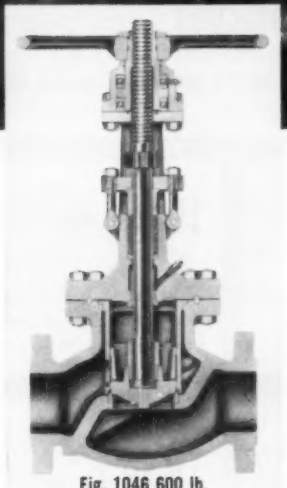


Fig. 1046 600 lb. O.S. & Y. Globe

In the power generation and industrial processing plants where Cast Steel valves are numbered by the score . . . where replacement and maintenance costs are recorded to the last penny . . . the true economy of Jenkins Valves is clearly seen.

Records will always show the extra value which Jenkins builds into Cast Steel valves, not only with design features you can see but also with unbending quality standards for alloys, castings, machining. Plus the toughest known testing and inspection system to assure perfection in every detail, and safety factors far beyond ratings.

Select from the Big Line in this Catalog. It includes pressure castings of Carbon, Carbon-Moly, 1¼% Chromium-Moly, 4% — 6% Chromium-Moly, 3½% Nickel . . . alloys that meet a wide variety of specifications. Also, a wide choice of patterns, sizes and seating material combinations to satisfy your different service conditions.

CALL YOUR JENKINS DISTRIBUTOR for a copy of Jenkins Cast Steel Valve Catalog and prices. Or write to Jenkins Bros., 100 Park Ave., New York 17.

Typical Jenkins features deliver lasting economy

A ball bearing yoke sleeve is standard on larger sizes • Cooling chamber and plugged connection for test purposes is regularly provided below packing box, but a lantern gland stuffing box is optional • Rustproof, lubricated and graphited, wire reinforced packing is standard • Soft steel ring joint body-bonnet gasket, fitted into accurately matched grooves to assure a vapor-tight joint • Seating is regrind-renew type.

JENKINS
LOOK FOR THE JENKINS DIAMOND
VALVES
JENKINS SINCE 1864
Jenkins Bros.

Sold Through Leading Distributors Everywhere

For more facts circle 520 on Reply Card

OF THESE 15 OUTSTANDING EVERY ONE CAME FIRST

FIRST FILAMENT From this small bulb, Mr. Edison's first successful filament bulb in 1879, has mushroomed the lighting industry of today.

FIRST MERCURY In 1934, General Electric co-introduced the high efficiency A-1 Mercury Lamps that reduced the cost of industrial lighting.

1938

Precision PAR projector lamps with superb beam control, air-tight seal of lens to reflector.

1942

Instant Start fluorescent gave quicker start, long life because of the G-E triple coil cathode.

1945

Slimline fluorescent with slender, graceful tube for more attractive lighting systems.

1952

RC-1 Mercury Lamp with color improved reflector; phosphor coating increased lamp efficiency 54%.

1954

High Output fluorescent delivered half again as much light as slimlines, more light from equal fixtures.

1954

Quartz Infrared—a powerful, compact new heat source with high concentration of radiant energy.

Progress Is Our Most Important Product

OPERATION up turn
Build sales and jobs in 58
GENERAL ELECTRIC

GENERAL

CONTRIBUTIONS TO LIGHTING FROM GENERAL ELECTRIC

FIRST FLUORESCENT Exactly 20 years ago, 1938, General Electric contributed the first fluorescent—a revolutionary increase in lighting efficiency.

ISN'T IT AMAZING? Each of these lamp types, and improvements in lamps, for commercial and industrial lighting, were developed and introduced into public use by General Electric to give you more value for all your lighting costs. Here are fifteen outstanding, but by no means *all*, of General Electric's contributions. The proud histories of General Electric and the lamp industry have gone side-by-side since the basic contributions of Mr. Light himself—Thomas A. Edison.

ISN'T IT LOGICAL? The company that gives you more value in new lamps and new improvements—and has been making both for a longer time—is also the company that makes the lamps that will be your best bet for day-in, day-out service and lowest operating cost. If you'd like more value for *all* your lighting costs, call your local General Electric Lamp representative, or write: General Electric Co., Large Lamp Dept. C-842, Nela Park, Cleveland 12, Ohio.

1950

R-52 Reflector Lamp—sealed-in reflector never needs cleaning, 500- and 750-watt sizes.

1952

Rapid Start fluorescent brought faster, flickerless starting *without* starters . . . cut maintenance, too.

1952

R-1 Reflector Mercury gave maintenance advantages of inside reflector, plus mercury lamp efficiency.

1955

RB-52—This design improvement made practical a regular glass, 1000-watt reflector lamp for high bay use.

1955

Bonus Line of filament lamps increased light output up to 15% by G-E stand-up filament design.

1956

Power Groove—This revolutionary lamp gives 2½ times the light of slimline; saves 5 to 20% on initial cost.

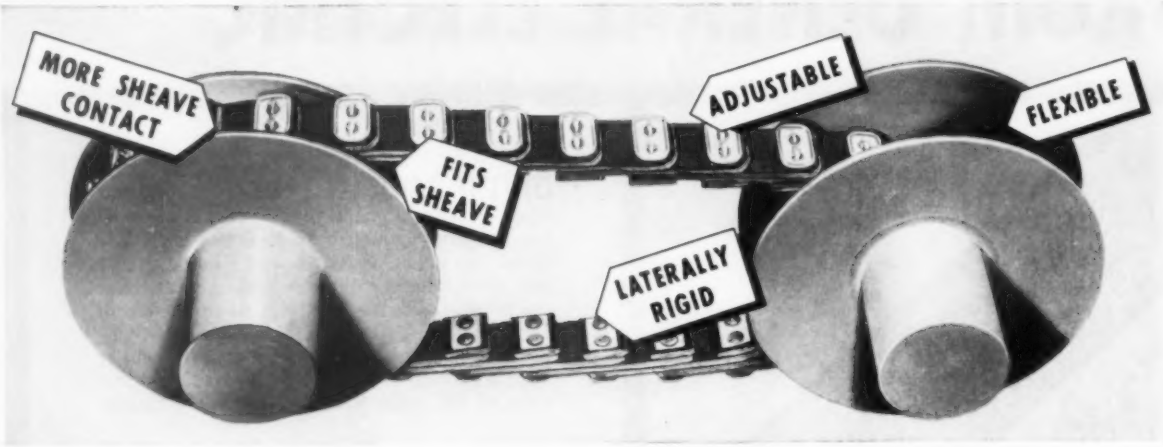
GE ELECTRIC

IT'S A FACT: **Over the past 3 years, General Electric has averaged a new lamp *every other working day!***

For more facts circle 521 on Reply Card

NEW! MANHEIM VARIABLE SPEED BELT

Replaces Enclosed Drive Belts Without Disassembly!



MVS Belt on a rotary annealing furnace drive gives dependable service even under extreme oil, dust and 200° F. operating conditions.

INSTALLS IN MINUTES INSTEAD OF HOURS— NO MACHINE DISASSEMBLY

A typical installation of a 2" MVS Belt operating an industrial production machine.

MVS BELT makes wood block and variable speed v-belts completely out-of-date

MVS Belt sets a new standard in V-to-V drives because it is adjustable to any length and is installed in minutes instead of hours.

Its patented design eliminates drive disassembly. MVS Belt is placed around the sheaves and coupled with T-screws and cup-washers, reducing down-time to a matter of minutes. Inventory costs are cut by eliminating the need to stock standard lengths. You can make as many as 25 sizes of variable speed belt from a single package of MVS Belt in a given top width. Each package contains 100 links, approximately 13 ft. Available in 26 widths from 1½" thru 5".

FREE LITERATURE SHOWS HOW MVS BELT DOES A BETTER JOB

Uniform thickness and width guarantee constant power delivery at all speeds with no cross-sectional distortion. MVS uniform links assure a perfectly balanced drive that reduces vibration and improves production quality. Priced to offer you big savings. *Write today for complete details on the new MVS Belt.*

★ **ADJUSTABLE TO ANY LENGTH**

★ **GUARANTEES CONSTANT POWER DELIVERY**

★ **REDUCES VIBRATION UP TO 90%**

MVS

MANHEIM

MANUFACTURING & BELTING CO.

Manheim 3, Pennsylvania

©M. M. & B. Co. 1958

For more facts circle 522 on Reply Card

For more facts circle 523 on Reply Card ——→

THEY *get to take a last look inside*

Standard Oil research develops method for inspecting lubrication of enclosed parts without disassembling

What if you had to make a final inspection of enclosed parts to be sure they were lubricated and you could not do it without disassembling? Standard Oil research scientists have just developed an instrument system that determines lubricant level in an instant. The device measures the density of an assembly so precisely the presence or absence of the desired quantity of lubricant registers on a meter.

Having such a unit might permit you to shorten an assembly line or reorganize assembly operations for greater convenience, speed, economy. The research men at Standard who developed this inspection method will be glad to share their know-how with you to help you fit it to your assembly operations.

This is the research pay-out you get from Standard. This is the "something more" Standard gives to industry besides the research which has established Standard Oil petroleum products as the industry criteria for quality.

For more information about this development or for assistance on other lubrication problems, inquire of any of the 48 Standard Oil district offices in the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

You expect more from **STANDARD** *and get it!*

Kellogg's of battle creek

a name the nation has all freight

You can measure the importance of uninterrupted production at BATTLE CREEK when you picture a daily output of 1,000,000 regular and family size packages of cereals plus 3,000,000 single-service packages.

A vital part of the production line is the uninterrupted performance of 10 OTIS Freight Elevators with lifting capacities ranging from 4,000 to 12,000 pounds. These elevators were installed between 1912 and 1955, yet all are still operating at their original efficiency—because of the carefully "engineered program" that constitutes OTIS Freight Elevator Maintenance.

Equally important as efficient operation is safe operation. It is KELLOGG'S policy to protect its workers to the fullest extent. OTIS Maintenance assures the proper working condition of all safety devices as well as the replacement of all wearing parts in advance of their breakdown point.

OTIS is making an important contribution to the uninterrupted flow of a production line that makes "KELLOGG'S OF BATTLE CREEK" a name that the nation can look for and find every morning.

otis

freight elevator

"ENGINEERED SERVICE BY THE MAKER"

OTIS ELEVATOR COMPANY • 260 ELEVENTH AVENUE • NEW YORK 1, N.Y.

looks for every morning
elevators under Otis Maintenance

maintenance that keeps freight elevators running like new

OFFICES IN 297 CITIES ACROSS THE UNITED STATES AND CANADA

For more facts circle 524 on Reply Card

Lubriplate No. 630-2 is a high temperature, extreme pressure, water-repellent, grease type lubricant. Ideal for the general lubrication of Industrial, Automotive, Construction, Farm and Marine Equipment. Lubriplate Grease Gun Cartridges provide an easy, quick, economical means of application. Prevent the waste and mess of hand filling. Packed 10 Cartridges in a handy carrying carton.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Write for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. LUBRIPLATE DIVISION, Fiske Brothers Refining Company, Newark 5, N. J. or Toledo 5, Ohio.

For more facts circle 525 on Reply Card

BACKTALK AND FORETHOUGHTS

Edited by Marjorie E. Weissman

Portrait of a Dust Collector

PLANT ENGINEERING:

"On page 42 of your May, 1958, issue of PLANT ENGINEERING, there is an excellent and interesting Plant Engineers' Digest item entitled, 'Bucket Elevator Rides the Rails To Handle Bulk Powdered Acid'—and there is a picture of one of our dust collectors.

"Can you furnish us with a glossy print of this picture? If not, can you put us in touch with the right people at Link-Belt Company who could furnish us with a copy of the picture? Anything you can do to help us will be greatly appreciated." *Frank R. Chase, Vice President, Torit Manufacturing Co., St. Paul, Minn.*

► Happy to oblige with a copy of the picture and with the name of the Link-Belt Company department that provided it.—*Editors.*

Fiber Tubes as Storage Aid

PLANT ENGINEERING:

"I appreciated the article in the July issue of PLANT ENGINEERING and would appreciate your advising me of the manufacturer and/or supplier of the fiber tube which was the subject of the article." *J. H. Knam, Plant Engineer, McKesson & Robbins, Inc., Bridgeport, Conn.*

► The article referred to by this reader is "Fiber Tubes for Racks" by George J. Bevans. It describes a storage system which utilized the tubes. We have forwarded a list of names of manufacturers of this item to Mr. Knam.—*Editors.*

Salesmanship for the PI.E.

PLANT ENGINEERING:

"'Salesmanship—the Plant Engineer's Most Important Skill' by W. O. Lindstrand, Chief, Facilities and Plant Engineering, Northrop Aircraft, Inc., appeared in the February, 1958, issue of PLANT ENGINEERING.

"If available, we would like to obtain 15 additional copies of this article for reference to one of our representatives who would like to distribute it to certain of his accounts.

"We are indeed grateful to you for your prompt action on our previous requests for reprints and if there is a charge in connection with this present request, please let us know the amount and a check will be mailed." *H. F. King, Industrial District Manager, Socony Mobil Oil Co., Boston, Mass.*

► We are happy to fill this request and have forwarded the tear sheets with our compliments.—*Editors.*

Sludge Removal

PLANT ENGINEERING:

"This office would appreciate being granted permission to make a limited number of copies of the article, entitled 'Fuel Oil Sludge Removal' published in PLANT ENGINEERING, copyrighted 1957 and appearing on page 542 of *Plant Engineering Practice*, published by F. W. Dodge Corporation, copyrighted 1958, for office use.

"It will be appreciated if you will indicate whether the requested copies of the above-identified material, with an appropriate credit line placed thereon, may be made for the indicated use." *William R. Orlandi, Asst., Legal Div., Office of Chief of Engineers, Department of the Army, Washington 25, D. C.*

► Permission granted.—*Editors.*

J. I. C. Symbols

PLANT ENGINEERING:

"Some time ago, I remember reading an article in your magazine dealing with pneumatic and hydraulic equipment symbols. I believe you stated toward the end of the article that reproductions of the Standard J.I.C. Symbol standards were available for the asking. I would appreciate a copy of this standard if you still have any. If you do not have any, would you please inform me where such a copy could be obtained." *F. A. Therrell, Jr., Interstate Oil Pipe Line Co., Shreveport, La.*

► Reprints of the J.I.C. standard Symbols were offered in a series of articles on fluid power maintenance, published by PLANT ENGINEERING in 1956 and 1957. Copies are still available.—*Editors.*

Can This Help You Too?

PLANT ENGINEERING:

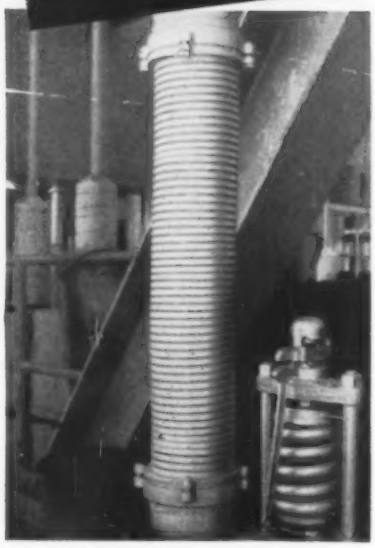
"Would you please send me a copy of the article appearing in the

what's your plant water problem?

CONSULTANTS ON INDUSTRIAL WATER PROBLEMS

BETZ LABORATORIES INC., Philadelphia 24, Pa.

PENFLEX
• CUSHIONS SHOCK
• PREVENTS BREAKS



PENFLEX TUBING ABSORBS THERMAL EXPANSION SHOCKS

Thermal expansion 900°F . . . pressures up to 850 psi. . . . impact and pipe movement under terrific strain, but Penflex safely handles them all. That's the story of Penflex 8" I.D. galvanized steel interlocked tubing welded into the pipeline, eliminating the cost of flanging the joint as well as the pipe. This was installed as an expansion joint on safety blow-off valves.

Wherever thermal expansion, pressures and shock are factors in keeping steam, air, water or chemical lines from breaking you can rely on Penflex Interlocked Tubing and Penflexweld High Pressure Tubing. Available in steel, bronze and stainless steel from ⅛" I.D. to 24" I.D. Write for complete details to Pennsylvania Flexible Metallic Tubing Company, Inc., 7214 Powers Lane, Philadelphia 42, Pa.

GET NEW DATA BOOK AND CATALOG

PENFLEX
TIGHT AS A PIPE BUT...
FLEXIBLE

For more facts circle 527 on Reply Card

BACKTALK— FORETHOUGHTS

June, 1954, issue of your magazine titled 'Temperature Rise in Motors and What It Means'." *C. D. Vunck, The Pure Oil Co., Smiths Bluff Refinery, Nederland, Texas.*

► As always, we are glad to send readers tear sheets of articles from previous issues if they are still available.—*Editors.*

About Solenoids

PLANT ENGINEERING:

"Would it be possible to get several copies of the article, 'Servicing the Solenoid,' which appeared in the May, 1958, issue of PLANT ENGINEERING?" *George I. Gedeon, Chief Electrician, Standard Portland Cement Co., Painesville, Ohio.*

PLANT ENGINEERING:

"We would like to obtain copies of the article 'Servicing the Solenoid' which appeared in PLANT ENGINEERING magazine in the May, 1958, issue, on page 122.

"Please send these to my attention and, if there is a charge, please bill the company." *D. H. Rowe, Advertising Manager, The National Acme Co., Cleveland, Ohio.*

► As usual, there is no charge for tear sheets. We have sent copies of this popular article to these readers with our compliments.—*Editors.*

Electrical Instrument Quiz

PLANT ENGINEERING:

"I would appreciate your sending me two reprints of the article 'Instru-Mentality' Parts I and II, found in the June and July, 1958, issues of PLANT ENGINEERING." *G. Mitchell, Maintenance Supt., New York & Pennsylvania Co., Inc., Lock Haven, Pa.*

► This two-part article will help test your electrical staffs on their knowledge of the uses and applications of electrical instruments. Tear sheets are still available, free of charge.—*Editors.*

Indexes for Plant Engineering

PLANT ENGINEERING:

"The Nestle Company has recently moved into its new office building in White Plains, New York. This move has enabled our technical publications to finally be centrally located in our large, new technical library.

"Back issues of technical magazines undoubtedly receive more use when there is a corresponding subject index for the periodical. I have contacted your New York office and understand that PLANT ENGINEERING publishes a bibliography including back issues to 1954. How often is this bibliography published and at what price would the index be available to our library? If the bibliography covers issues farther back than 1954, we would be interested in knowing how far back and if reprints of these articles can be obtained. Any information along these lines would be greatly appreciated." *Douglas D. Pleasanton, Engineering Div., The Nestle Co., Inc., White Plains, N. Y.*

► An annual index to PLANT ENGINEERING has been published since 1947. However, only those for 1955, 1956 and 1957 are available. Tear sheets of articles from 1956 and 1957 are also available.—*Editors.*

Construction Briefs in Demand

PLANT ENGINEERING:

"After reading the article in 'Backtalk and Forethoughts' in the August edition of PLANT ENGINEERING, I should be obliged if you forward to the writer the four booklets on 'Construction Briefs,' for which I enclose the amount of $2.00." *C. G. Bryan, Plant Engineer, Canadian Car Co., Ltd., Montreal, Que., Canada.*

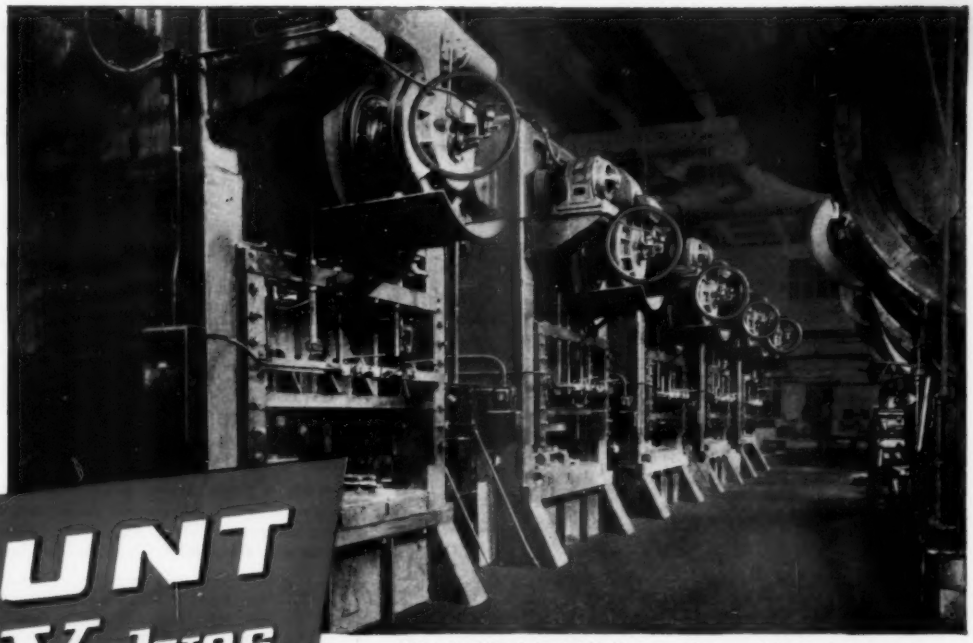
PLANT ENGINEERING:

"The writer would like to receive all of the available reprints of the regular department of PLANT ENGINEERING entitled 'Construction Briefs.'

"I have been receiving Plant Engineering only for the past year or so, and would like these reprints in order to fill out a notebook which I have been keeping of this series of articles. I find this review very helpful in my daily work as a number of the subjects covered are the type of thing which, if not used daily, escapes one very readily. Many of these things the writer has not had occasion to use since graduating from college.

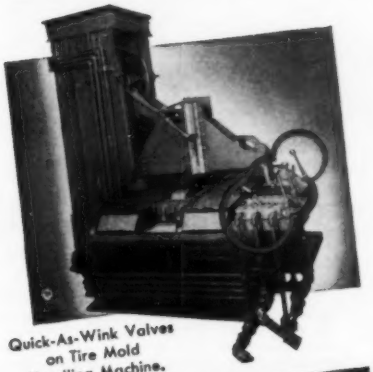
"I realize this is a big order, so please advise me of the cost of obtaining these reprints." *John M. Giesey, Chief Engineer, H. P. Snyder Manufacturing Co., Inc., Little Falls, N. Y.*

►Each of the four booklets already published in this series costs 50 cents. They are reprinted from PLANT ENGINEERING.—*Editors.*



Quick-As-Wink Solenoid Air Valves on Battery of Heavy Duty Presses.

HUNT CONTROL Valves



Quick-As-Wink Valves on Tire Mold Handling Machine.

Quick-As-Wink Valve on 8-spindle Automatic Chucking Machine.

proven dependable operation

no after hours Siss-s-s-s

That harsh sizzling noise you hear out in the plant, after the work force has gone home, is there during the day also. Only you can't hear it then. It's air, seeping out through inferior valves, wasting from $5.00 to $500.00 per month. And leaky valves mean sloppy machine control; danger of "repeating"; possible injury to the operator; or a breakdown involving costly repairs, material spoilage, lost production and customer ill-will.

Stop the s-i-z-zling by installing Hunt valves on all your air and hydraulic controls. Positive and fast-acting Hunt valves are designed and built to seal tightly, preventing leaks, and minimizing the danger of breakdowns and tie-ups. Sizes from ⅛" to 8". 29 Hg vacuum to 250 p.s.i.; up to 5000 p.s.i. on oil and water. *Zero leakage.* Recognized by operators, foremen and superintendents everywhere for unsurpassed economy, low maintenance and long, efficient service.

HUNT

Quick-As-Wink® AIR AND HYDRAULIC CONTROL Valves

Manufactured by HUNT VALVE COMPANY, 2081 East Pershing St., Salem Ohio

For more facts circle 528 on Reply Card

WRIGHT Motor-driven CRANES &

MOTOR-DRIVEN CRANES • 1-Ton to 25-Ton Capacities, Up to 55-ft. Spans

• Now, you can buy modern, efficient WRIGHT Motor-Driven Cranes two ways—factory-assembled as a complete unit or built locally from WRIGHT "matched" components. Shown below is a B-1514 top running double bridge crane and a B-516 underhung single bridge crane—just two of the many models of WRIGHT Motor-Driven Cranes. All can be built locally from end trucks, trolley hoists and crane drive units. All will save you money by drastically reducing freight charges. Instead of paying shipping costs on a complete unit, you pay only for the component parts and order heavy I-beam structurals locally. In addition, WRIGHT will furnish you with a detailed assembly diagram and a complete list of the structural components you'll need.

FEATURES OF WRIGHT MOTOR-DRIVEN CRANES

End Trucks of welded steel channel construction with heavy steel plate diaphragms. Squaring shaft of ground and polished steel—geared to both end trucks to assure uniform travel of the crane.

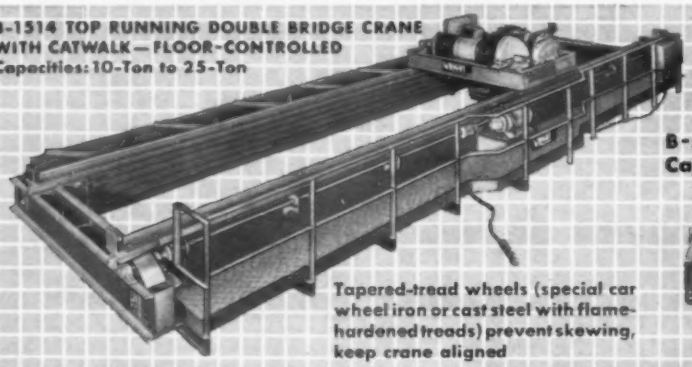
Timken Tapered Roller Bearings (two to each truck wheel). Placed in opposition to one another, these bearings compensate for both radial and thrust loads and will safely absorb shock treatment. Adjusting nut on wheel axle takes up bearing play with ease.

Ring Gear • Heat-treated steel. Teeth are 20° stub, involute form.

Full Integrated Electrical Controls for WRIGHT Cranes equipped with a WRIGHT Hoist and a WRIGHT Crane Drive Unit will be factory-installed at no extra cost if you assemble your own crane locally.

Controls • Single speed pushbutton control furnished with cranes equipped with fluid drive—two speed and variable speed pushbutton control on cranes without fluid drive. 6-button pendant—2 buttons each for crane travel, trolley motor and hoist motor.

B-1514 TOP RUNNING DOUBLE BRIDGE CRANE WITH CATWALK—FLOOR-CONTROLLED
Capacities: 10-Ton to 25-Ton



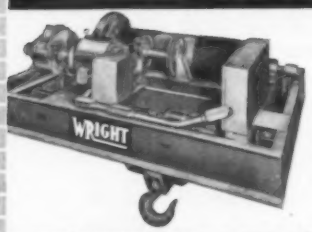
Tapered-tread wheels (special car wheel iron or cast steel with flame-hardened treads) prevent skewing, keep crane aligned

B-669 Top Running Double Bridge Crane and B-514 Top Running Single Bridge Crane can be furnished with cab control or floor control in a wide variety of speeds, lifts and types of control. These units are not shown

B-516 UNDERHUNG SINGLE BRIDGE CRANE
Capacities: 1-Ton to 10-Ton

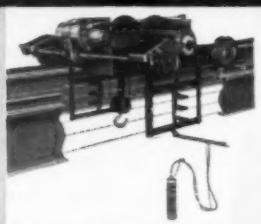
Flangeless wheels run on beams with varying flange widths. Guide rollers keep crane properly aligned

ASSEMBLE YOUR OWN CRANE WITH STRUCTURALS AND COMPONENTS BOUGHT LOCALLY!



TROLLEY HOIST FOR B-1514 CRANES

Standard B-1514 cranes are equipped with a top running, double beam trolley hoist. This unit is either motor-driven or hand-geared.



TWH 2-MOTOR TROLLEY HOIST FOR B-669 CRANES

This unit is either motor-driven or hand-geared, and includes a WRIGHT *Speedway* Electric hoist. The trolley is designed so that short or long drum hoists can be used with standard 5'-0" center bridge beams. Welded steel frame is carried on double flanged, chilled tread, car wheel iron wheels equipped with two Timken Tapered Roller Bearings. Upper, lower limit switch. 4, 6 or 8-button pendant.

WRIGHT TWO-MOTOR ELECTRIC HOIST

Recommended for use with the WRIGHT B-516 crane shown above, or the B-514 crane, not shown. Available in a capacity range of 4-ton to 10-ton. Unusually compact for close headroom. Features NEMA 30-minute motors exclusively, two-speed or variable speed controls. Heat-treated alloy steel gears, pinions. Ductile gear cores are shock-resistant. Anti-friction bearings. Weston load brake. Ingenious motor brake is cam-controlled...foolproof adjustment.

WRIGHT CRANE DRIVE UNIT AND END TRUCKS

This compact, adaptable drive unit, totally enclosed for outdoor service, consists of an electric motor and well proportioned gear reduction. Single speed motors drive through fluid coupling, which is optional with two speed or variable speed motors. Two frame sizes accommodate 2 to 7½ HP motors. All motors up to 5 HP are rated on the basis of 30-minute duty cycle. Full enclosed sealed ball bearings. Unit is shown driving standard underhung end truck on the right and top running end truck on the left.

Wright Hoist Division
AMERICAN CHAIN & CABLE

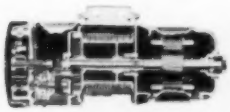
York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

ACCO
TRADE MARK

HOISTS...for Lowest "Total Cost"

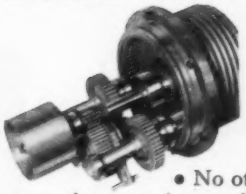
EASY BRAKE MAINTENANCE

• Ingenious new brake design makes periodic adjustment for hook drift a snap! Cam sets to 3 fixed positions. As brake lining becomes worn, cam position is changed—thus bringing contact to a new ½ section of brake lining. When brake lining becomes worn in position No. 3, it's time for new brake lining to be installed. Springs and solenoid never need adjustment.



GREATER WORK OUTPUT

• Wright electric hoists feature 30-minute motors exclusively. Balanced heavy duty design makes possible the continuous handling of heavy loads on any duty cycle for which a 30-minute NEMA motor is satisfactory. All gears and pinions are alloy steel, heat treated. Ductile gear core supplies shock resistance to most severe service stresses, gears and gear shaft bearings splash lubricated in oil-tight gear housing.

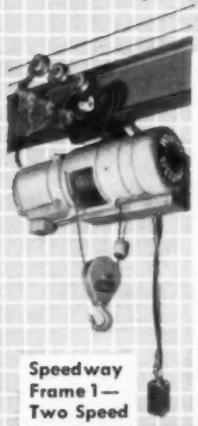


LONGER SERVICE LIFE

• No other hoist gives you the superior engineering advantages found in a Wright! For example, internal gear ring with heavy flanged cross section is bolted to drum at six points to provide extreme resistance to distortion. Weston type, multiple disc mechanical brake has linings that are fastened to functional braking members by cementing process instead of obsolete riveting.

WRIGHT *SPEEDWAYS*

Capacity Range—¼ Ton to 10 Ton



Speedway Frame 1—Two Speed

You'll find there's a Wright Speedway Electric Hoist to fill any production line requirement in the ¼ to 10 ton capacity range—with single, two-speed or variable speed controls—available all types of suspensions. All have NEMA 30-minute motors...alloy steel gears and pinions, heat treated. Ductile gear cores are shock resistant...splined connections minimize distortion. Antifriction bearings throughout. Weston type load brake. Fool-proof motor brake, "nothing to adjust but the cam."

NEW—WRIGHT ELECTRIC CHAIN HOISTS

THE HOIST WITH THE FEWEST WORKING PARTS!

Available in Two Capacity Ranges as pictured—Single Chain: 300 to 2000 lbs., Double Chain: 3000 to 4000 lbs.

Long Life—Safety—Minimum Repair are assured by these features: Alloy Load Chain is wick lubricated for longest life and heat treated for hard wearing surface with ductile core to resist shock...Side pull will not break or damage chain...Drop-forged alloy steel wheel, hooks, couplings...Precision ball bearings...Double Braking system—self-locking worm gear reduction load brake—efficient Motor Brake is fast, easy to adjust.

WRITE FOR COMPLETE PRODUCT INFORMATION

• Complete information about the WRIGHT products shown on these pages is available by writing our York, Pa., office. For your convenience, fill in the coupon below, giving the specific booklet numbers you wish to receive. Additional information available upon special request.

DH-43B • B-669 Cranes
TWH Trolley Hoist
Underhung Trolley Hoist

DH-227 • B-516 Cranes

E-58 • *Speedway* Hoists (½ to 10 Tons)

DH-431C • Crane Drive Unit

DH-73A • Electric Chain Hoist

DH-133D • *Speedway* Hoists (500 to 4000 lbs.)

WRIGHT HOIST DIVISION
American Chain & Cable Company, Inc.
York, Pennsylvania

Gentlemen:
I would like to receive the product information checked below:

☐ DH-43B ☐ DH-431C
☐ DH-227 ☐ DH-73A
☐ E-58 ☐ DH-133D ☐ Other_____

NAME_____

FIRM_____

STREET_____

CITY_____ ZONE____ STATE_____

For more facts circle 529 on Reply Card

PLANT ENGINEERS' DIGEST —so those who rush may read and know what's new

Edited by Marjorie E. Weissman

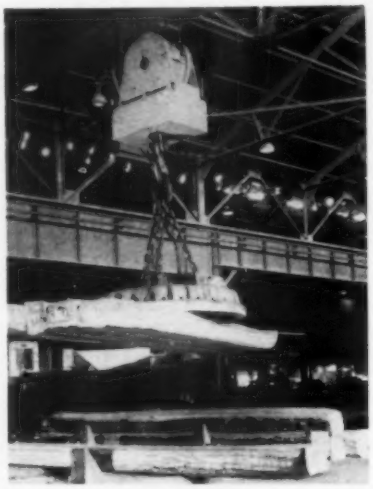
Magnet Turner Improves Safety

SAFETY WAS THE PRIMARY concern of the Timken Company in their first installation of a mechanical magnet turner on a 15-ton overhead crane.

Previous to the purchase of the turner, a floorman was needed to follow the crane and to swing loads into position. Despite safety measures, hazards of the job to floor personnel remained.

With the turner, the crane operator can position a load, eliminating the need for any worker on the floor to be near the load.

The device consists of a worm gear powered by an electric motor and attached to the crane block. A rotating hook from which the magnet is suspended, extends from the bottom of the unit, which was made by the Mansaver Co. Minor modifications were made to adapt it to our use. *From a release of The Timken Roller Bearing Co., Canton, Ohio.*



Magnet turner eliminates need for floorman when handling steel billets.

Steel Plate Saves Floor

HEAVY TRAFFIC of materials handling equipment was causing surface chipping and crumbling of the concrete floors of Thor Power Tool Co., Aurora, Ill. The problem was worse in areas surrounding the elevator approach.

To provide a safe surface, weekly patching was necessary and a new floor was needed every two and one-half years.

(Continued on page 44)

Immersion Cleaning of Electric Motors Cuts Time and Money Spent on Job

PLANT MOTOR REWINDING work at the Automatic Transportation Company, Chicago, Ill., has been reduced by two-thirds annually since an immersion method of cleaning motors has been used.

Where it formerly required around 8 hrs to break down a motor and clean each piece by hand, 1 hr 20 min is now required.

All that is needed for the job is a metal tank (cost, $40.00) and 100 gal of electric motor cleaner solvent, made by Northwood Manufacturing Chemists, Inc., Porterfield, Wis.

The motor to be cleaned is removed from its machine, connected to power leads and is completely submerged in the nonconducting solution for a period of three to four minutes depending on the size and condition of the motor. Even in the case of extremely dirty motors, the time should not exceed 7 min since the motor is operating under an overload and will overheat.

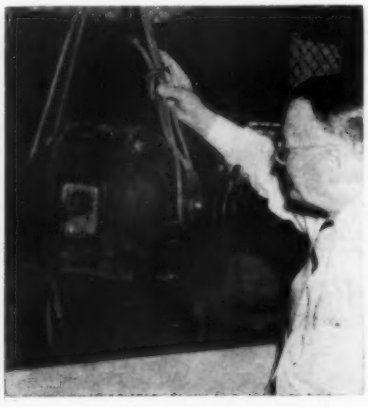
After allowing the motor to turn in the solution, the power is turned off and the motor is lifted out and thoroughly dried by an air blast. Steam can not be used, as an alkali film would form, causing the motor to short out. Thirty to 50 motors can be cleaned in one batch of solution.

After drying, the motor is greased, and lubricants are added while it is operating to expel old deteriorated grease and cleaner. The motor is again energized as grease is pumped in a second time. This is continued until evidence of new lubricant is visible at the drain plug.

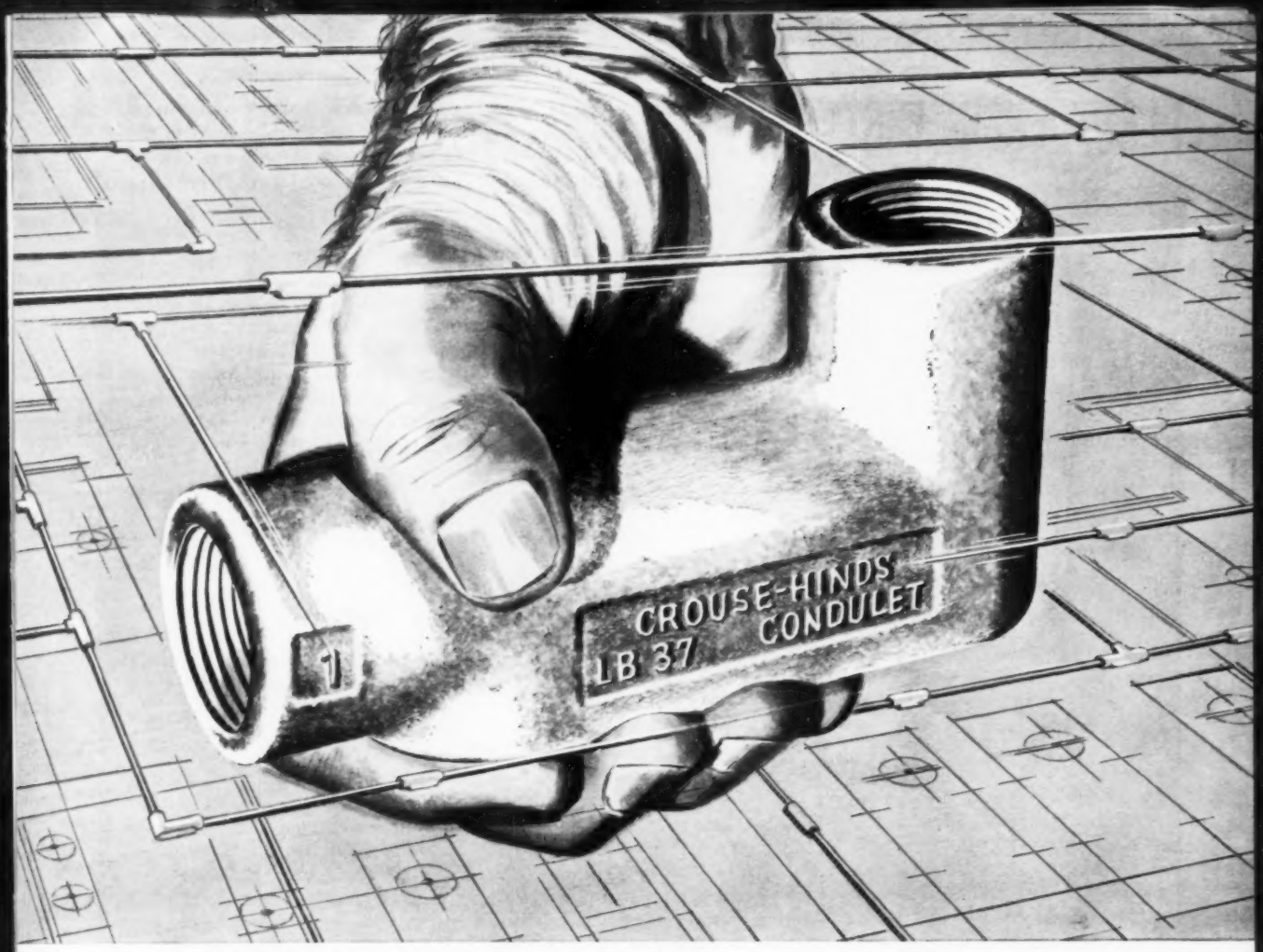
The cleaning operation, according to George McHenry, Plant Engineer, does not affect wiring, lacquer or insulation.

This method has been in use for several years at the plant, during which time no motor has required a complete break down for cleaning. Motors are cleaned more frequently than formerly and motor burnouts have dropped from 5 per cent to 1½ per cent. *From a release of Automatic Transportation Co., Div. of Yale and Towne Mfg. Co., Chicago, Ill.*

Motor immersed in cleaning solution.



Plant engineer inspects cleaned motor.



For qualities beyond your specifications —

CONDULETS*...

made only by Crouse-Hinds

You'll find Condulet electrical equipment in two out of three plants across the country. It's there because electrical engineers have discovered that it provides *more* than standard performance.

And no wonder. Only Condulet rigid conduit fittings have all these features:

✓The wedge-nut cover fastener.

✓Longer hubs for a better wrench grip.

✓Taper tapping to match ASA standard tapered conduit threading for a rigid joint that will not loosen.

✓A triple long-lasting finish that exceeds Federal government and U.L. specifications.

✓A smooth, integral bushing to protect cable insulation.

✓Feraloy, a special alloy that is strong, resists corrosion, and gives full, sharp threads.

For installations where aluminum, plastic or plastic-coated conduit is used, we can supply either copper-free aluminum or plastic-coated Condulet fittings as required.

• *Next time you order, specify Condulet equipment. From the simplest fitting to complex motor controls, the name "Condulet" and the Crouse-Hinds trade-mark are your assurance of receiving the finest.*

CROUSE HINDS

MAIN OFFICE AND FACTORY: SYRACUSE, NEW YORK

Crouse-Hinds Company of Canada, Ltd., Toronto, Ont.

• CONDULET® ELECTRICAL EQUIPMENT (Explosion-Proof and Conventional) • FLOODLIGHTING • TRAFFIC CONTROL SYSTEMS • AIRPORT LIGHTING and WEATHER MEASURING EQUIPMENT

* CONDULET is a coined word registered in the U.S. Patent Office. It designates a brand of products made only by the Crouse-Hinds Company.

These products are sold exclusively through electrical distributors. For application engineering help, contact one of the following offices: Baton Rouge Birmingham Boston Buffalo Chicago Cincinnati Cleveland Corpus Christi Dallas Denver Detroit Houston Indianapolis Kansas City Los Angeles Milwaukee New Orleans New York Omaha Philadelphia Pittsburgh Portland, Ore. Salt Lake City St. Louis St. Paul San Francisco Seattle Tulsa Washington **Resident Representatives:** Albany Atlanta Baltimore Charlotte Chattanooga Jacksonville Reading, Pa. Richmond, Va. Shreveport

For more facts circle 530 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 42)

The problem was solved with the installation of steel floor plate, which within five months had paid for itself in the reduction of repair and maintenance costs. Dust from spalling was eliminated which made the floors easier to clean and loss suffered from upset loads was also eliminated. *From a release of Acme Steel Co., Chicago, Ill.*

Refrigerated Rock Quarry Becomes Food Warehouse

WHAT WAS FORMERLY a rock quarry, near Kansas City, Kan., is now used as a warehouse for refrigerated and frozen foods in transit between production and market areas. The man-made cave, which naturally maintains a constant temperature of 55 F and relative humidity of 85 to 90 per cent, has a storage capacity of 70 million pounds of food.

Although most of the space was allotted to frozen foods, several "high" temperature rooms were designed. Storage chambers are separated by cement block walls with 6 in. of foamed glass insulation with a vapor barrier.

To serve these rooms, five separate refrigerating systems were installed, each system using a compressor driven by a 15-hp motor. Evaporator units with built-in electric defrosters were suspended from the rock ceiling at strategic locations to maintain even temperatures. Air cooled condensers were used in the system, since the ambient temperature is 55 F.

The compressors were installed in single systems so that each could work without being affected by the operation of another.

Refrigerant piping was arranged for proper pitch and sized for velocities which would provide continuous return of oil from the system to the compressor without the use of an oil separator. The piping runs extend 250 to 300 ft.

Design of the freezer rooms, which are held at —4 F to —6 F, included a calcium chloride brine circulating system employing ammonia compressors. The brine is cooled to —17 F in shell and tube heat exchangers, equipped with suction domes and is circulated by pumps through seamless steel pipe to more than 50 centrifugal blower type coolers located in the storage areas. There are six 9-cylinder ammonia compressors and four boosters, with a total of 520 hp. Shell-type ammonia condensers are used, each 24 in. in diameter by 18 ft long.

In addition to the usual gas and liquid cooler, there are desuperheaters in the discharge lines from both the booster and second stage machines. These are equipped with finned surfaces and are cooled by fans which handle air introduced from, and returned to, the mine area. *From ARW Journal, published by Air-Conditioning and Refrigeration Wholesalers, Columbus, Ohio.*

Spray Drying Feed

BECAUSE A LABORATORY-sized spray drying unit proved successful in drying products such as pigments, plastics, plastic resins, pharmaceuticals and other compounds at American Cyanamid Co., Bound Brook, N. J., a continuous dryer belt in the Organic Chemicals Division, was replaced by a spray dryer unit.

The drying unit, which is 14 ft in diam, handles a 45-50 per cent

(Continued on page 46)

Vibration Damping for Centrifuge Foundations Prevents Possible Damage to Plant Structure

CENTRIFUGE INSTALLATIONS, under adverse operating conditions, can become regular vibration producing "factories." Therefore, it is important that precautions are taken to make certain damaging effects of heavy vibration are kept from the plant structure.

Centrifuges are generally mounted on concrete slabs or steel supported by a concrete base. In the case of horizontal axis centrifuges, the ballast to which the machine is directly mounted should be 2 to 2½ times the weight of the machine to achieve desired damping effect.

To help obtain this vibration damping, and guard against harmonic phasing or natural frequencies of the structure, the problem should be considered from two points of view. One involves the frequency of the soil, since the soil itself has a natural frequency; the other is to select structural steel beams of proper dimensions for the undamped structure.

The two accompanying tables may come in handy to those considering centrifuge installations. Table I covers the frequency of various soils, and Table II can be used for selecting the proper steel beams, using a suitable safety factor as applied to centrifugal and motor speeds, or any adjacent forced vibration. The second table is based on reversing the general frequency procedure, to relate the physical dimensions of steel beams in relation to deflection due to loading. *From a release of Chemical Machinery Division, Baker Perkins, Inc., Saginaw, Mich.*

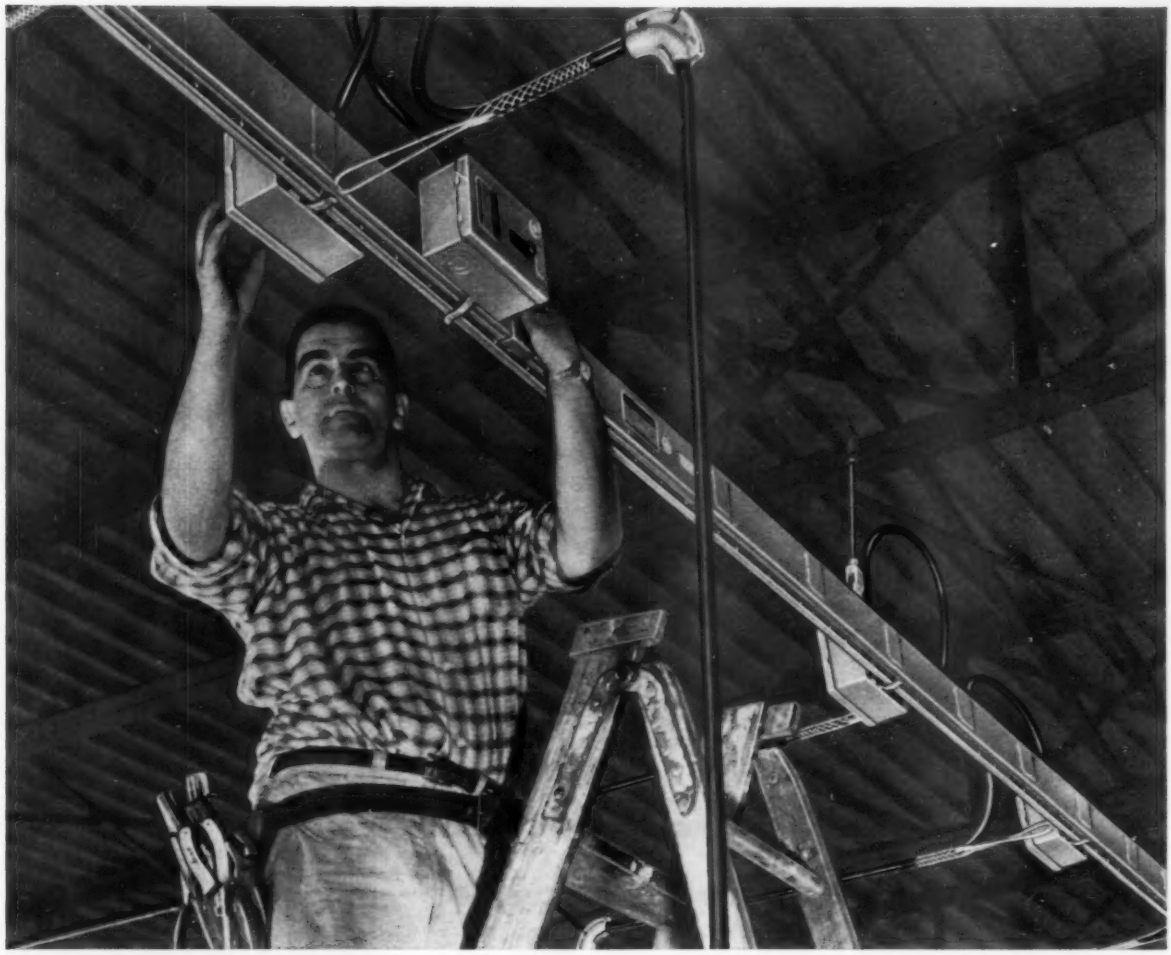
Table I. Frequency of various soils.

Soil	Frequency in cycles per min
Light soft clay	720
Wet light sand	900
Medium clay	900
Hard clay	1150
Sand and rock rubble	1350
Lime stone	1800
Granite	2400

Table II. Maximum allowable deflection of steel beams for mounting centrifuge.

Frequency CPM	Deflection	Frequency CPM	Deflection
300	0.400	1400	0.0181
400	0.222	1500	0.0158
500	0.142	1600	0.0139
600	0.0985	1700	0.0124
700	0.0725	1800	0.011
800	0.0555	1900	0.00985
900	0.0439	2000	0.0089
1000	0.0355	3000	0.004
1100	0.0294	5000	0.00142
1200	0.0246	10000	0.00036
1300	0.021		

New idea offers more for the money...



New G-E 100-amp plug-in busway

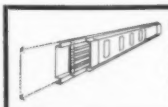
saves 25% in wiring cost, hailed as "Wiring Method of Tomorrow"

Now, a plug-in busway that costs no more installed—and usually substantially less—than wire and conduit!

Or as a leading electrical contractor in Wilmington, Delaware, puts it: "With Type DH, I can save 25% over the cost of conduit and wire when there are four or more tap-offs in the system."

Type DH—rated 100 amperes, 3 pole or 4 wire, 3 phase 600 volts maximum—serves as either a feeder or plug-in system and may be used wherever exposed wire and conduit might be applied. Light, sturdy and small in size (in cross-section not much larger than a pack of king-sized cigarettes), DH may be hung edgewise on 10-foot centers. Eighteen dead-front outlets are provided in each 10-foot length. For added flexibility, each outlet accepts a variety of fusible, no-fuse and circuit breaker plugs.

G-E distributors, *nationwide*, stock Type DH, including its wide variety of fittings and accessories. So DH busway matches wire and conduit in *availability* as well as cost. Ask your General Electric distributor or representative for Bulletin GEA-6172. Or write directly to **Distribution Assemblies Department, General Electric Company, Plainville, Connecticut.**

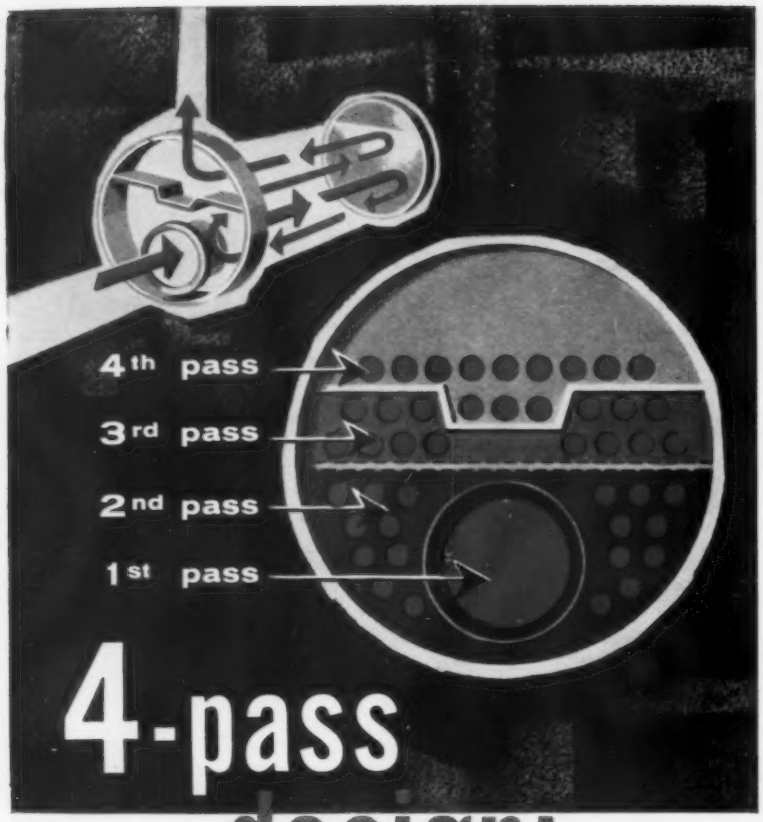


DH BUSWAY EXTRA VALUE
Telescoping length adjusts between 42 and 54 inches. This, plus flexible fittings, eliminates need for exact measurements. Rigid fittings—elbows, crosses and tees—adapt busway to virtually any building contour.

OPERATION up turn — Buy now for extra values — GENERAL ELECTRIC

GENERAL ELECTRIC

For more facts circle 531 on Reply Card



4-pass design:

High fuel-to-steam efficiency for greater fuel economy

EVERY CLEAVER-BROOKS boiler has 4-pass fire tube construction — to scrub more heat from the flame. Maintains high flue-gas velocity . . . to provide right conditions for optimum heat transfer. This is just one of the Four Design Standards that make pre-engineered Cleaver-Brooks boilers your best packaged-boiler buy.

Other Design Standards

5 SQ. FT. OF HEATING SURFACE per boiler horsepower — prolongs boiler life, assures greater efficiency and lower maintenance.

FORCED DRAFT supplies air for efficient combustion, regardless of draft conditions. Easiest to maintain of all air-control methods.

UPDRAFT CONSTRUCTION — Low furnace keeps hottest combustion gases well below water level for safety's sake.

This exclusive combination of Design Standards is the key to the superiority of Cleaver-Brooks packaged boilers, 15 to 600 hp, 19 sizes, 130 models; steam or hot water; oil, gas or combination oil/gas fired.

For all the facts, call your boiler man from Cleaver-Brooks or write Cleaver-Brooks Company, Dept. L, 364 E. Keefe Ave., Milwaukee 12, Wisconsin.

Cleaver Brooks®

ORIGINATOR AND LARGEST PRODUCER OF PACKAGED BOILERS

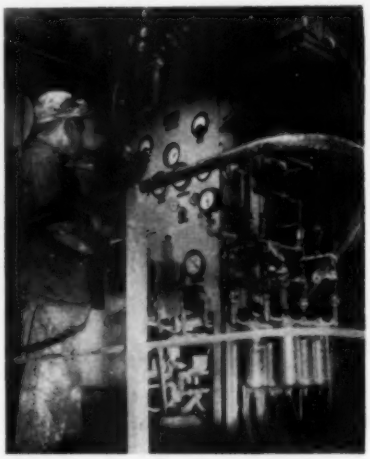
For more facts circle 532 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 42)

feed slurry. It operates around the clock, seven days a week.

The filtered slurry is fed into the drying chamber where it is atomized by a centrifugal wheel operating at 20,000 rpm. Heated air picks up the drops of slurry, converting them into moist particles almost instantly. Further drying of the particles takes place as they pass through the drying chamber to the cyclone collectors. From the time the slurry is introduced into the dryer, to the time it passes to the collectors, only a few seconds elapse. There are no deleterious effects to the product as a result of the heat, since the evaporation keeps the feed comparatively cool.



Spray dryer used in drying feed, is controlled from this instrument panel.

Use of spray drying has cut both labor requirements and maintenance costs and has increased product yield and quality. The problem of dust, experienced with the belt drying method, has been eliminated. *From a release of Bowen Engineering, Inc., North Branch, N. J.*

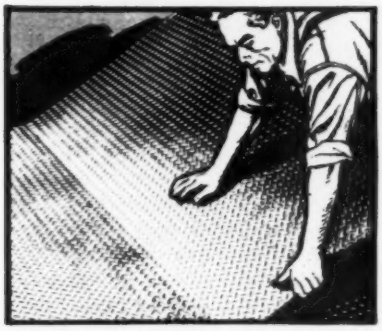
Mechanical Pipe Cleaning

MECHANICAL CLEANING tools of the type used for boiler tubes, can be used effectively in many cleaning jobs involving pipes, tubes or conduits.

The Philadelphia Gas Works has

LOW COST DIFFERENCE BETWEEN

SLIPPING FEAR



SAFETY

Eliminate high-cost accidents with low-cost SUPER-DIAMOND. Yes, A.W. SUPER-DIAMOND safety floor plate replaces DANGER with SAFETY wherever hazardous slipping conditions occur. Here's why!

- Raised steel, diamond-shaped figures give *maximum slip-skid resistance from all angles of approach.*
- Tough rolled steel construction lasts the life of the installation.
- Non-directional pattern—no matching problems—minimum waste.
- Easily fabricated for quick installation.
- No maintenance problems—cleans, drains rapidly.
- Use as independent flooring or flooring overlay.

Get complete . . . free . . . information that may save you thousands! Write today on your company letterhead to Dept. SD-E9.

Pattern actual size

ALAN WOOD STEEL CO. ESTABLISHED A.W. 1826 CONSHOHOCKEN, PA.

Wherever oil, grease, or other substances raise special slipping accident hazards, we suggest a check on the special non-slip qualities of A.W. ALGRIP—the world's only abrasive rolled steel floor plate.

A.W. SUPER-DIAMOND

ROLLED STEEL FLOOR PLATE

ALAN WOOD STEEL COMPANY • CONSHOHOCKEN, PA.

Other Products: A.W. ALGRIP Abrasive Rolled Steel Floor Plate—Plates—Hot and Cold Rolled Sheet and Strip—(Alloy and Special Grades)

For more facts circle 533 on Reply Card

GET A WAYNE DD-1 HAND PUMP FOR

DOUBLE

ACTION Double action diaphragm hand pump that works easily with push-pull operation. Pumps up to 20 gallons per minute.

SERVICE Made for quick easy service of light-medium oils, cutting fluids, alcohol, lube and flushing oils, gasoline, kerosene and fuel oil.

DEPENDABILITY

Many exclusive features, plus flow with both push and pull strokes assure dependable delivery.

QUALITY Built for extra service with Nylon shaft bearing, integral O-Ring seal, double diaphragms, non-clogging screens and self-closing valves.

Here is the ideal economical, easy to use hand pump for every place in your plants. No costly maintenance . . . always ready for use. Write for folder showing all uses and models.

FOR DISPENSING . . .

cutting oils, paints, solvents and almost all types of liquids. May be used on drums or on existing pipelines.

FOR REFUELING

of industrial lift trucks, tractors, plant trucks, gasoline driven compressors and small auxiliary gas and diesel engines.

THE WAYNE PUMP COMPANY

Industrial Division—Fort Wayne 4, Indiana

A Division of Symington-Wayne Corporation

Wayne

For more facts circle 534 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 42)

Two-minute pass with cutter head helped to free pipe of accumulated rust.

used this equipment for two jobs. The first was to restore to service 12,000 ft of rusted, 1¼-in. gas pipe. Each of the 22-ft to 24-ft lengths involved was made serviceable in four minutes by making a two-minute pass with a cutter head and a two-minute pass with a brush head. A portable compressor brought to the area made it possible to clean the pipes on the spot. Cost, including labor, was about 2 cents per foot.

Similar equipment was used for cleaning new pipe installed in a natural gas line. The pipe, ranging from 16 in. to 20 in. in diameter, was delivered in 40-ft sections.

A portable air-driven mechanical cleaning unit was used to remove the accumulations of rust and foreign matter that could cause fouling of pressure regulating and gas measuring equipment. One pass through each pipe length with a brush head removed the rust which had not been touched by previous cleaning methods including the use of large, fixed-diameter wire brushes. *From a release of Thomas C. Wilson, Inc., Long Island City, N. Y.*

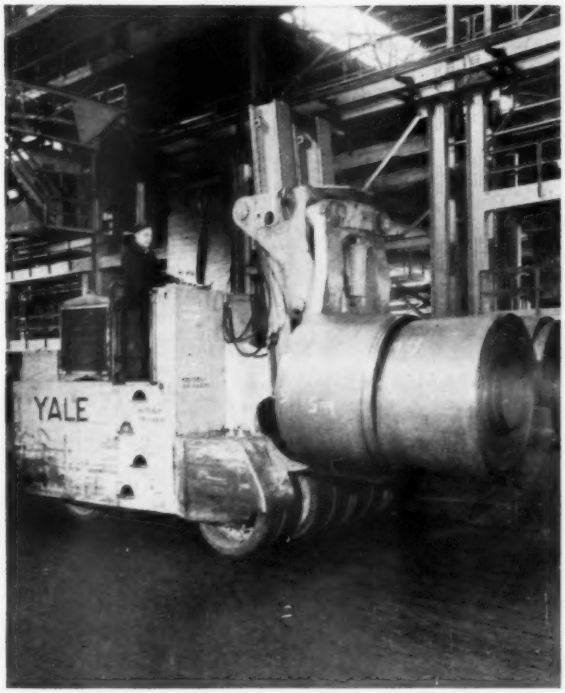
Synchronous Motor Solves Continuous Feed Problem

HIGHLY ACCURATE feed mechanisms for both liquids and solids require a constant speed motor. At Omega Machine Division of B-I-F Industries, Providence, R. I., a synchronous induction motor provided the answer. Having high pull-out torques, the mo-

B.F.Goodrich

Pneumatic tires

B.F.Goodrich makes a complete range of sizes and variety of tread designs, including the new All-Purpose.



Solid Tires

Pressed-On Solid in regular or Deluxe Cushion, or Vulcanized-On Solid — which is right for you? What tread design? What compound?

Which industrial tires are right for your job?

Free B.F.Goodrich TIRE AND WHEEL TW Analysis tells you

Can save you as much as 50% on tire costs!

Problem: There are many different industrial tire types, sizes, tread compounds and tread designs. Each one is built for a specific materials handling job. Do you know which tires are right for *your* job?

Solution: Without cost or obligation your B.F.Goodrich Tire and Wheel Analysis man will study your equipment, loads, hauling surfaces and other special problems you have. He'll recommend the right tires for you to use—recommendations that are unbiased because B.F.Goodrich makes a *complete* line of industrial tires.

Result: You can save as much as 50% on industrial tire costs, as much as 20% on maintenance costs. Mail the coupon today for your FREE B.F.Goodrich TW Analysis.

A special consulting service is available to manufacturers of materials handling equipment.

Specify B.F.Goodrich tires when ordering new equipment

B. F. Goodrich Tire Company
A Division of The B. F. Goodrich Company
Department TW-725, Akron 18, Ohio

I would like further information on your FREE TW Analysis.

NAME_____

COMPANY_____

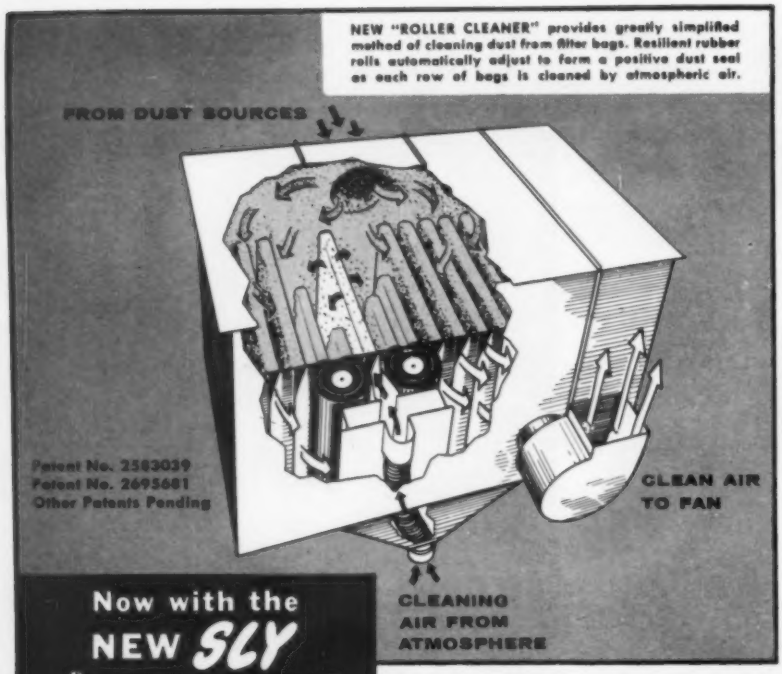
STREET_____

CITY_____ ZONE_____ STATE_____

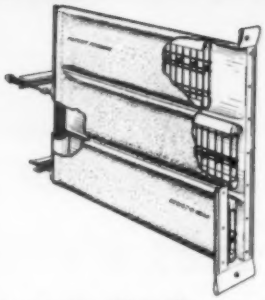
B.F.Goodrich *industrial tires*

© The B. F. Goodrich Company

For more facts circle 535 on Reply Card


NEW "ROLLER CLEANER" provides greatly simplified method of cleaning dust from filter bags. Resilient rubber rolls automatically adjust to form a positive dust seal as each row of bags is cleaned by atmospheric air.
FROM DUST SOURCES
Patent No. 2583039
Patent No. 2695681
Other Patents Pending
CLEAN AIR TO FAN
CLEANING AIR FROM ATMOSPHERE

Now with the NEW *SLY* "ROLL-CLEAN" DYNACLONE



As much as 3 TIMES LONGER BAG LIFE

NEW SLY "RESIST-O-WEAR" FILTER BAGS (patent pending) provide complete dust filtration with as much as three times longer life than conventional bags. This has been proved on the toughest field installations.

The new bag has three equal-size sections. Each pocket has two spacers, making a total of six per bag. Weight is distributed on three seams rather than one, minimizing strain. A special protective flap on the back end prevents abrasion from incoming dust.

Now standard in the new "Roll-Clean" Dynaclone, Sly "Resist-O-Wear" bags combine with all the other superior Dynaclone features to assure greatest dust collecting efficiency with unequalled maintenance-free service.

ALL THESE FEATURES IN ONE DUST FILTER

- New "Resist-O-Wear" bags last as much as three times longer.
- Constant suction at dust sources—complete dust collection.
- Automatically self-cleaning for continuous operation.
- Free-rolling cleaner. Complete dust seal—automatic seal adjustment.
- Greater filtering capacity; smaller space requirements.
- Simplified construction for ease of inspection and servicing.

SEND FOR New Bulletin 105 and New 36-page Dust Control Catalog 104.

SINCE 1876 SLY

THE W. W. SLY MANUFACTURING CO.

4600 TRAIN AVENUE • CLEVELAND 1, OHIO
OFFICES IN PRINCIPAL CITIES

For more facts circle 536 on Reply Card

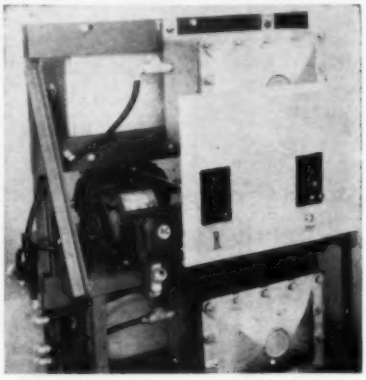
PLANT ENGINEERS' DIGEST

(Digest begins on page 42)

tors remain in synchronism regardless of load or line voltage fluctuations.

Installed in the remote control stand for a feeder, the motors are used as a primary drive for the gravimetric feed mechanism which is accurate within plus or minus one per cent. Three-phase, 60-cycle, 220-440 v, they drive a variable speed transmission, recently developed by Omega for this application, which in turn drives the master of a servo-motor set.

Output of the master servo-motor is electrically connected to



Remote control stand for feeder. Synchronous motors drive variable speed transmission which drives servo-motor.

the slave servo-motor which drives a weight along a balance bar at a constant rate with a worm-type lead screw. The rate of flow is kept constant in this way even though the force on the material being fed is continually being changed by the weight of the remaining material.

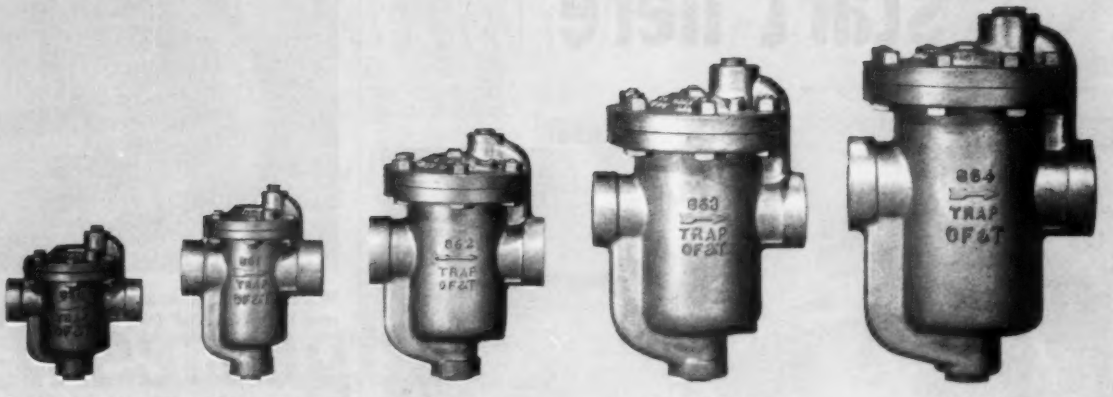
To prevent slippage, Omega uses a segmented-tooth belt drive between the motor and the transmission. *From a release of Allis-Chalmers Manufacturing Co., Milwaukee, Wis.*

Furnace Doors Water-Cooled

LIGHTWEIGHT, WATER-COOLED doors have replaced solid doors on billet furnaces at the McKees Rocks, Pa. plant of American Forge & Manufacturing Co. The

ANNOUNCING a Complete New Line . . .

ARMSTRONG Open Float and Thermostatic Steam Traps



Designed and Made by Armstrong Especially for Low Pressure Heating Service

■ Armstrong Open Float and Thermostatic Traps are the result of the demand by user-owners and contractors for an effective, trouble-free steam trap for heating service.

How They Work

When the steam is first turned on, Armstrong O.F.&T. traps quickly vent the air that has accumulated in the heating units. After start-up, the traps will vent air and CO_2 gas at steam temperature to prevent corrosion of unit heater tubes and other types of finned radiation. Condensate is removed as fast as it accumulates without loss of steam.

Advantages of Armstrong O. F. & T. Traps

The design and construction of Armstrong Open Float and Thermostatic Steam Traps provides outstanding benefits to both the owner and the installing contractor:

LOW COST is made possible by simple, compact design and large volume production.

EASY INSTALLATION. Pipe connections are horizontal and opposite. Traps are supported by the connecting pipes.

INTERNAL CHECK VALVES of 18-8 stainless steel can be furnished with the traps to save cost of installing external check valves.

YEARS OF SERVICE LIFE . . . Working parts are all stainless steel, highly resistant to both corrosion and wear.

MINIMUM MAINTENANCE . . . comes not only from the use of stainless steel parts, but also because the trap is self-scrubbing. Ordinary sediment and sludge are washed right through with the condensate.

Further Information Available

If a trap with these features is of interest to you, get in touch with your nearby Armstrong Representative. Ask him for Bulletin 775 which gives price, dimension and capacity data, or use the coupon below.

ARMSTRONG MACHINE WORKS
9126 Maple Street • Three Rivers, Michigan

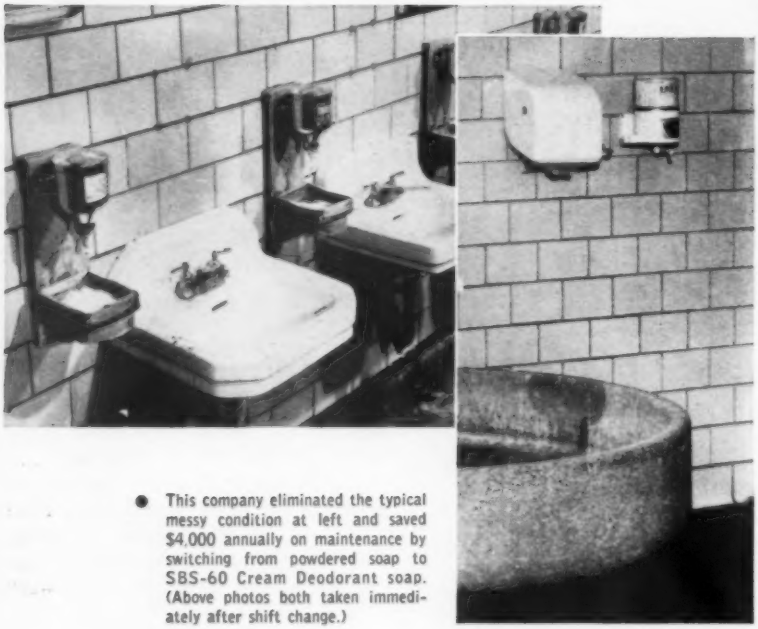
FREE BULLETIN
No. 775 gives detailed information on Armstrong O.F.&T. traps.

ARMSTRONG MACHINE WORKS
9126 Maple Street, Three Rivers, Michigan
Please send a copy of Bulletin No. 775.

Name_____
Company_____
Street Address_____
City_____ Zone____ State_____

For more facts circle 537 on Reply Card

If you're serious about economizing, start here



● This company eliminated the typical messy condition at left and saved $4,000 annually on maintenance by switching from powdered soap to SBS-60 Cream Deodorant soap. (Above photos both taken immediately after shift change.)

Waste soap is not the only needless expense in washrooms. Waste *maintenance* is even more costly. The company in the picture at right above saved some $4,000 a year in maintenance men's time by switching to SBS-60, the cream-type cleanser. How did SBS-60 accomplish this? Easy! One SBS-60 dispenser replaces six or more conventional powdered-soap dispensers. And the SBS-60 dispenser need be filled as little as once every three days, opposed to as often as three times daily for powders. In addition to all this maintenance time saved, of course, there is the tremendous saving in soap itself, for SBS-60 is almost impossible to waste. If you really want to cut costs, start by investigating this new concept in cleansing economy: SBS-60 Cream Deodorant soap! Write for details to dept. 58-J 3.

the washword of industry

SBS sugar beet products co.

SAGINAW, MICH. • Los Angeles, Calif. • Newark, N. J.
CANADA: Chemical By-Products, Ltd., Rexdale, Ontario

For more facts circle 538 on Reply Card

PLANT ENGINEERS' DIGEST

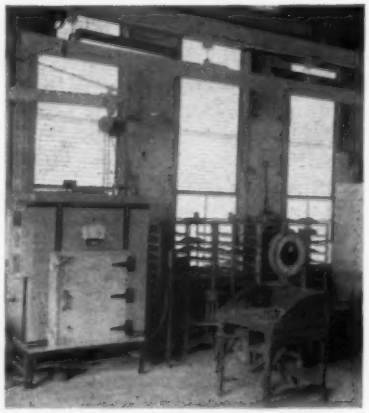
(Digest begins on page 42)

Water-cooled door has replaced solid one that required frequent rebuilding.

solid doors used to burn off at the bottom and had to be rebuilt and relined every five or six months. Temperatures in the furnaces are approximately 2300 to 2400 F.

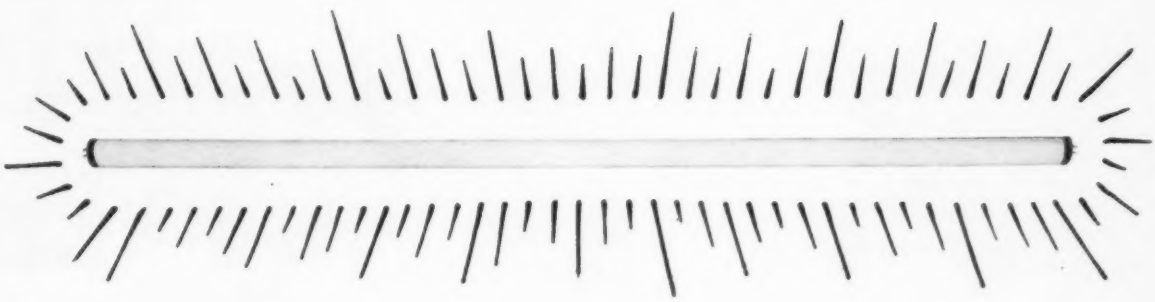
One water-cooled door has been in service for more than a year without interruption. Formerly it was thought that such a door would reduce the temperature immediately inside the furnace, but this was found not to be so. *From a release of Blaw-Knox Co., Pittsburgh, Pa.*

Shatterproof Glazing

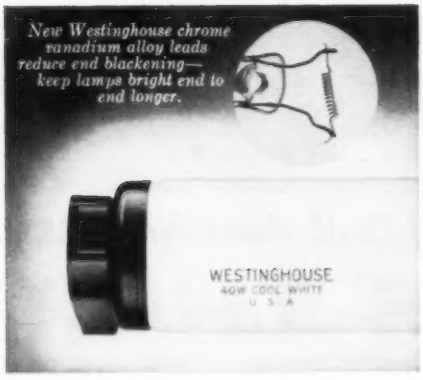


Natural light is transmitted through shatterproof, reinforced plastic glazing at Rockwell Mfg. Co. (From a release of Structoglas Div., International Molded Plastics, Inc., Cleveland, Ohio).

Goodbye, "Dead-Ends"!



Westinghouse lamps stay bright from end to end... l-o-n-g-e-r !


New Westinghouse chrome vanadium alloy leads reduce end blackening—keep lamps bright end to end longer.
WESTINGHOUSE
40W COOL WHITE
U. S. A.

"ULTRALUME" phosphors coat the inside of all Westinghouse fluorescent lamps. Only Westinghouse has "Ultralume"...the phosphors that assure maximum brightness for the life of the lamp.

Banish light-robbing, unsightly "dead-ends" on your fluorescent lamps. Next time, use Westinghouse lamps with exclusive "Ultralume"™ phosphors and new chrome vanadium alloy leads. The combination of revolutionary new leads and Ultralume phosphors make Westinghouse lamps give maximum light longer and keep them bright end to end!

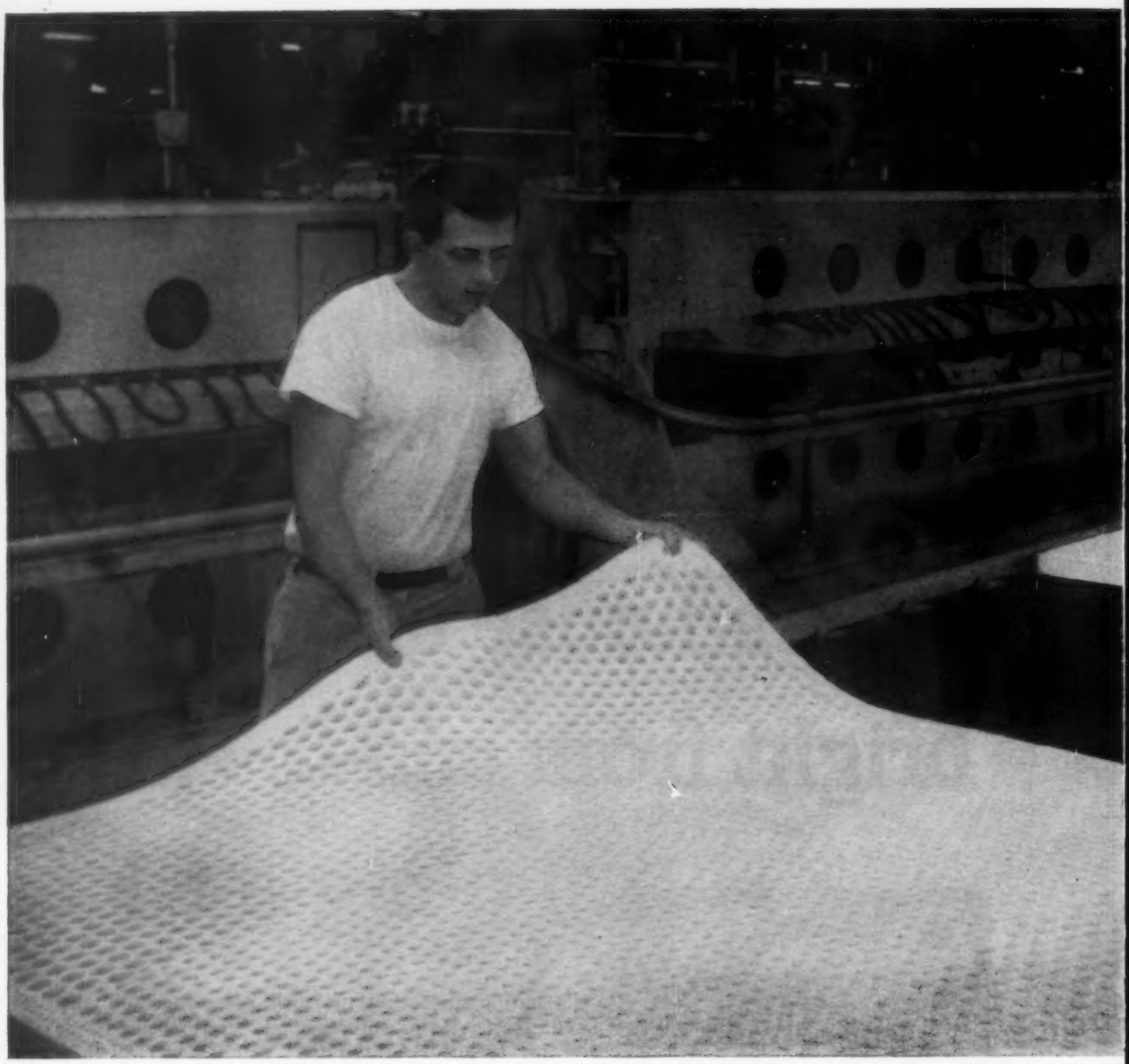
Save money, too! Lamp for lamp, Westinghouse fluorescents give more light for the same wattage. You get more light per foot . . . more light per dollar!

Specify Westinghouse on every lamp order. Call your local authorized Westinghouse agent or write—Westinghouse Lamp Division, Bloomfield, N. J.

YOU CAN BE SURE...IF IT'S

Westinghouse (W) FLUORESCENT LAMPS

For more facts circle 539 on Reply Card



125 B. F. Goodrich presses, using Gulf Harmony Oil, mould

GULF MAKES THINGS

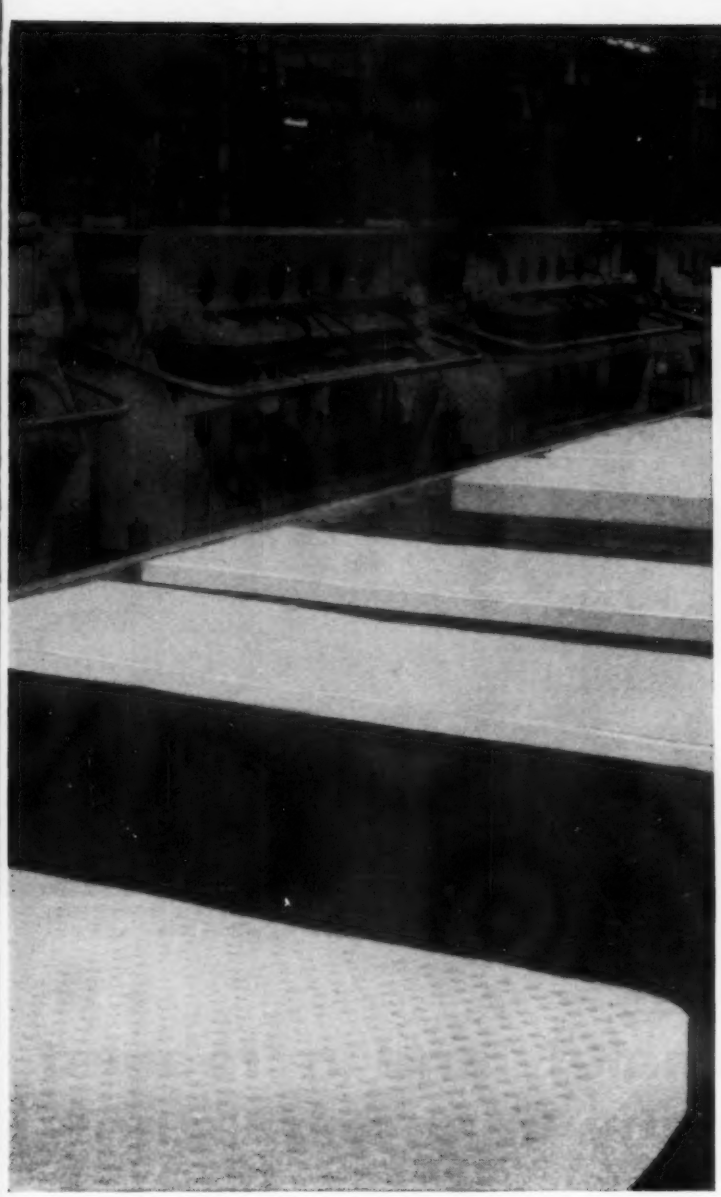
"We'd be up to our necks in expensive scrap if we used an inferior hydraulic oil," says Alex Sandomirsky, chief engineer at the B. F. Goodrich Sponge Products Division in Shelton, Connecticut.

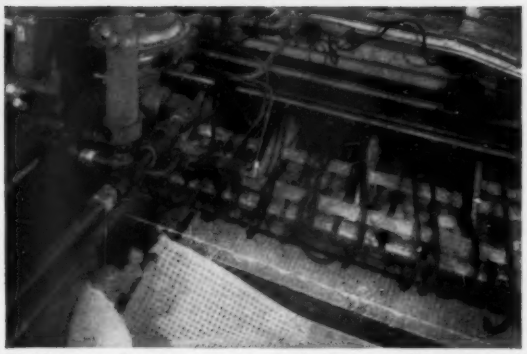
The plant turns out highest quality B. F. Goodrich Texfoam mattresses, pillows, auto seat and furniture cushions around the clock. It has the world's largest installation of rubber moulding presses, 125 of them on one central, 700-gallon hydraulic system. The oil in this system *has* to be reliable, for if one press went out all would have to close down.

B. F. Goodrich uses Gulf Harmony Oil 53 as the power medium, serving these presses 24 hours a day, 6 days a week . . . tough service for any hydraulic oil. Gulf Harmony stands up perfectly in this operation, to the complete satisfaction of B. F. Goodrich. Production results are excellent.

Here's why Gulf Harmony Oil stands up so well, so long

New Gulf Harmony has outstanding oxidation resistance. It assures longer life, freedom from harmful sludge deposits. An anti-corrosion additive protects against rust. A patented anti-foam agent eliminates objection-





Fluid power for the presses. Gulf Harmony Oil delivers it here, through hydraulic equipment in upper foreground. Pump pressures up to 600 psi. Clamp pressures up to 1500 psi. Here, a press operator strips a B. F. Goodrich Texfoam mattress from the press.

Gulf Sales Engineer Peter K. Eaton, left, discusses hydraulic mechanism of a rubber moulding press with Russel T. Korolyshun, project engineer. In the press—ready to be stripped from it—is an L-cushion for a sofa.

foam rubber 24 hours a day . . .

RUN BETTER!

able foaming. Original viscosity and color stability are retained longer.

As a multi-purpose lubricant and hydraulic fluid, Gulf Harmony Oil is available in a full selection of grades to meet all your needs. It is ideal for hydraulic systems, air compressors, blowers, dryer-roll bearings, machine tools, electric motors, central circulating systems and a host of other applications.

Your Gulf Sales Engineer can show you how Gulf Harmony Oil can help you improve production and reduce maintenance costs. Just call your nearest Gulf office, or write for illustrated bulletin.

GULF

GULF OIL CORPORATION
Dept. DM, Gulf Building
Pittsburgh 30, Pa.

Without obligation on my part, send me illustrated bulletin on Gulf Harmony Oil.

Name_____

Title_____

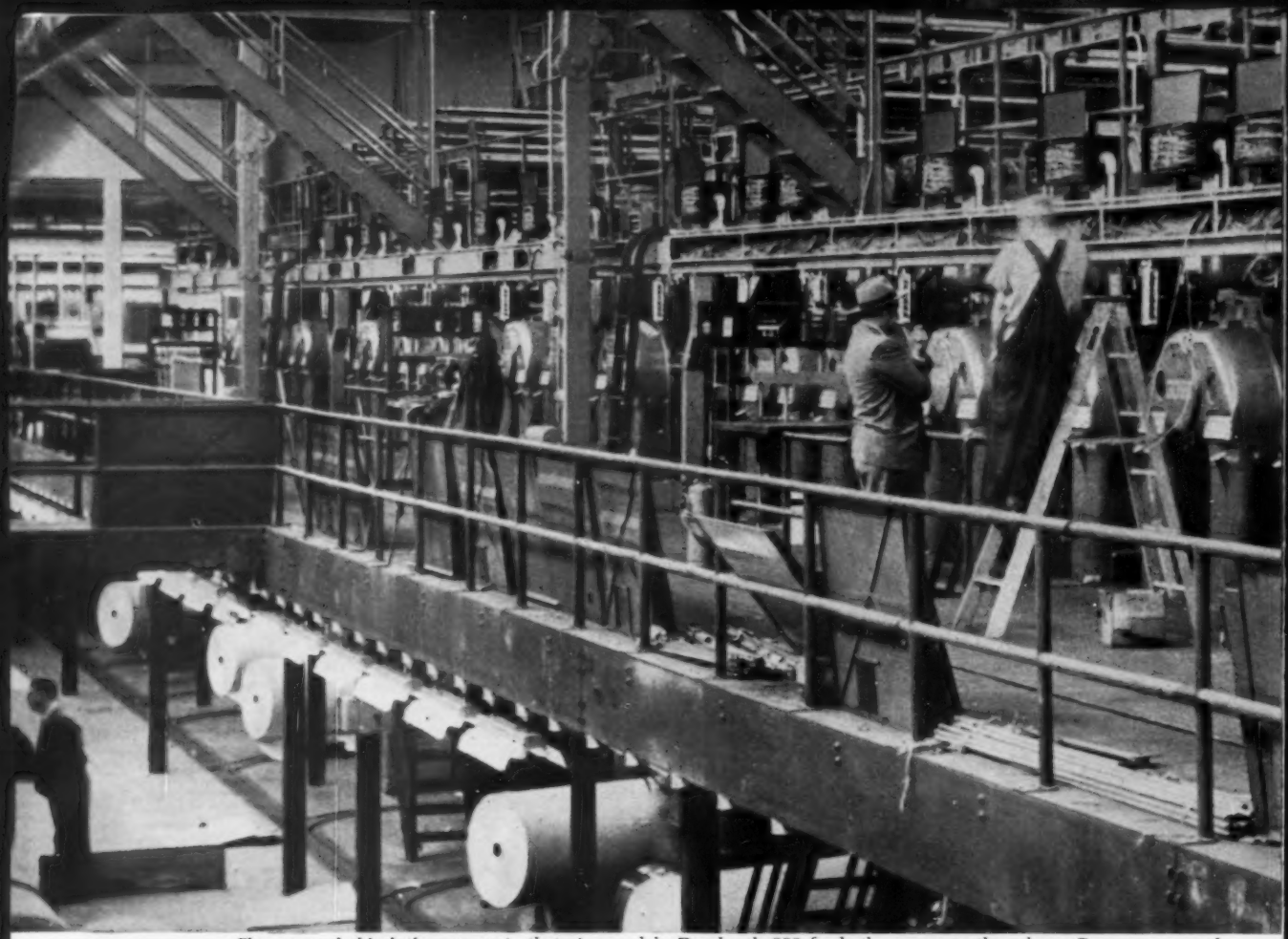
Company_____

Address_____

City_____ Zone____ State_____

PE-5213

For more facts circle 540 on Reply Card



The news behind the news—is that Anaconda's Densheath 900 feeds the power to these huge Goss presses at the Chicago Sun-Times' new Fort Dearborn plant. Densheath 900's special heat-resistant insulation enables current to be car-

AT THE CHICAGO SUN-TIMES

An extra margin of safety and increased are provided by Anaconda's new

Electrician laces in Anaconda Densheath 900 for a 50-hp press-drive motor. In addition to three master panels, each press has its own control panel.

Nothing "spoils" as fast as news. Thus, in a newspaper operation, there's no time for machine breakdowns, costly delays. The news *must* get out!

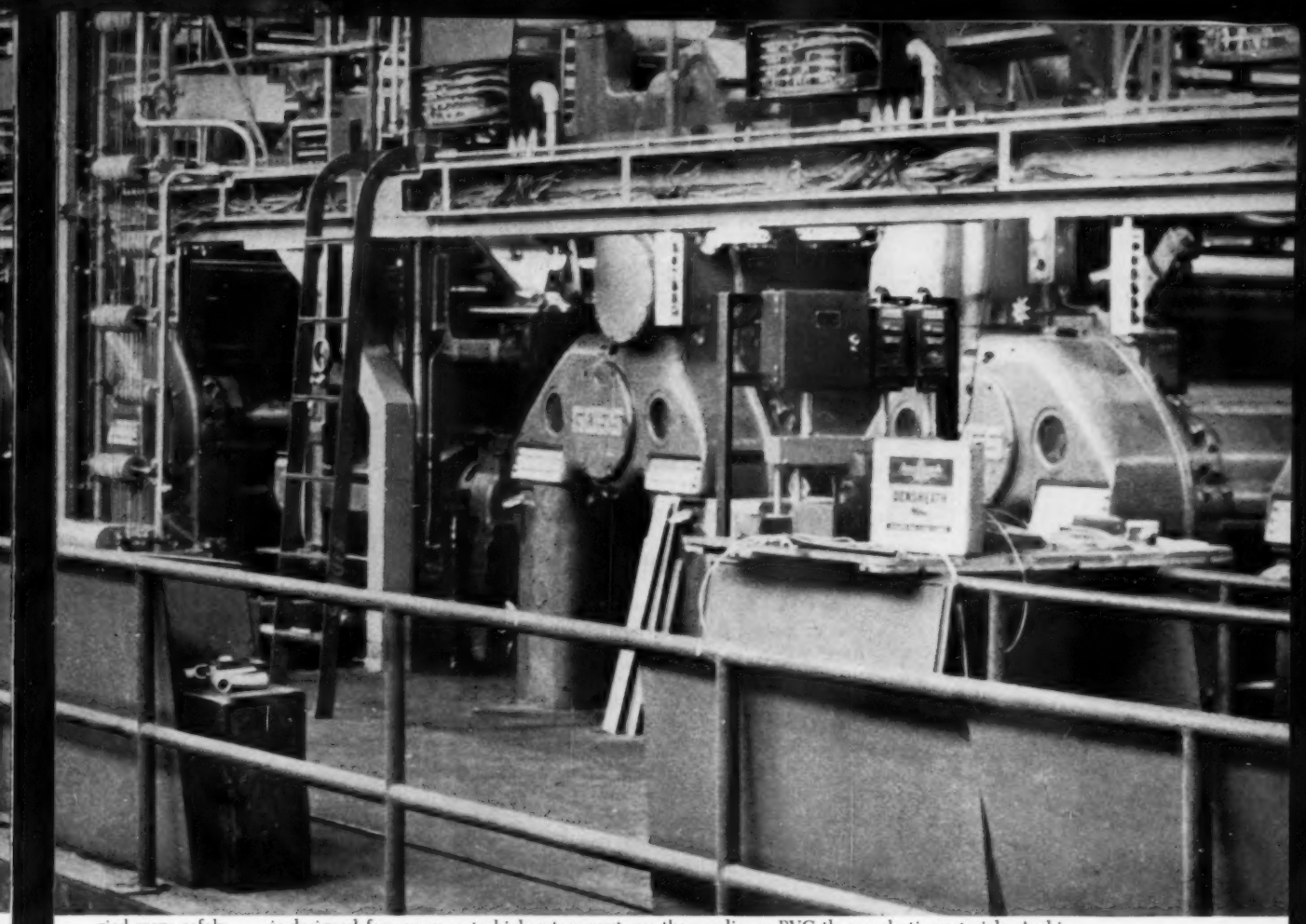
To see that it does—at the Chicago Sun-Times—Anaconda's Densheath 900 is on the job powering 30 giant Goss presses, plus teletypes, intercom systems, office equipment.

In *your* business, too, power failures can mean *serious* losses. Densheath 900 has the *"built-in" extra performance* your important circuits require.

Tough, flexible Densheath 900, then, deserves attention. This top-quality industrial wire is sound insurance against power failure. Here's why:

1. **LONG LIFE.** Consistently superior performance throughout the years under the severest operating conditions.
2. **HIGH HEAT RESISTANCE.** Can safely carry higher currents under exposure to higher ambient temperatures.
3. **CHEMICALLY STABLE.** Retains its electrical and physical characteristics despite exposure to cutting compounds, lubricants, most acids and alkalies.
4. **MOISTURE RESISTANCE.** The presence of moisture does not affect the satisfactory performances of Densheath 900.
5. **EASY TO INSTALL.** Flexible, easily formed, resists tearing, abrasion and stretching, strips easily.
6. **LESS "DRAG."** Coated with exclusive new "slipper" coat which offers less drag, greater resistance to scraping.

If yours is a plant now going to higher ambients, or higher temperature operations in corrosive atmospheres, Densheath 900 will be of particular interest. It provides an extra margin of safety for those "hot spots" which



ried more safely . . . is designed for exposure to higher temperatures than ordinary PVC thermoplastic materials. Architects for the new building were Naess and Murphy, Chicago. Electrical Contractor: White City Electric Co., Chicago.

protection against power failures industrial wire – Densheath 900!

are always occurring . . . assures superior performance from your wiring. For contractors and distributors, Densheath 900 offers another advantage: it eliminates duplicate stocks, since the one wire can be used for building construction, appliance and machine tool applications. See the Man from Anaconda or your Anaconda Distributor about Densheath 900. Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y. 58304

RATINGS

The exceptional heat, chemical and moisture resistance of Densheath 900 enables it to satisfy the following:

- *U/L requirements for type TW*
- *ASTM D 734 Polyvinyl Insulating Compound*
- *90C Switchboard, Appliance and Machine Tool Wiring*
- *National Machine Tool Builders Association Specifications*

SEE THE MAN FROM **ANACONDA®**

FOR **DENSHEATH 900**

DENSHEATH 900

Densheath 900, the 90C industrial wire, is the result of more than 20 years of Anaconda's research and development in the field of thermoplastic wire and cable. Its specially heat-resistant insulation handles current more safely . . . it is designed for exposure to higher temperatures than ordinary PVC thermoplastic materials.

Underwriters' Laboratories Inc. Labeling: Type TW, Oil Resistant 60 C. Sizes 14 Awg through 4/0-Awg also labeled as Appliance Wiring Material for use at temperatures not exceeding 90C, or not exceeding 60C where exposed to oil.

For more facts circle 541 on Reply Card

OPERATION AND PRODUCTION —pointers for the industrial plant engineer

Edited by Vern Kempf

Blower Downtime Problem Solved

INSTALLATION of a split-wind blowing system has solved the problem of continuous air delivery to two blast furnaces at the McLouth Steel Corporation plant, Trenton, Michigan. Furnished by the Dravo Corporation, the system will be operated when either of two turbo blowers is down for periodic overhaul. Air is directed from the blower in service to either or both of the blast furnaces in sufficient volume to maintain production.

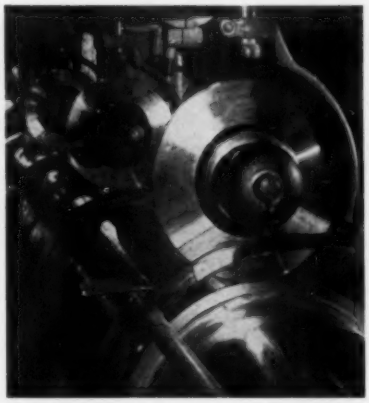
Designed to supply each of the furnaces with 60,000 cfm at normal operating pressure, the installation will eliminate loss of tonnage due to turbo blower downtime. The air volume is approximately 75 per cent of that used when both furnaces are operating at peak capacity on individual blowers.

Operated from a master control panel in the blowing room, selector valves for each furnace were installed in the old blast mains. The existing volume regulators and turbo blower governors were modified for the new system. Volume-pressure valves are used to transfer control of the turbo blower governors from the conventional regulators to the new split-wind pressure regulator.

Carbide Slitters Outlast Steel

RACING through winders at speeds ranging from 1200 to 2000 fpm, paper is cut into strips by the shearing action of steel knives against carbide bottom slitters at the Lee Paper Company, Vicksburg, Michigan.

Each of the three paper winding machines in operation have six steel slitting knives on the upper side of the paper running through the machine and six Carboloy cemented carbide slitters on the underside of the paper. The top knives, driven by the powered slitters below, are set at an angle of two to three degrees in relation to the bottom slitters.



Carbide slitting knives, bottom, outlast steel and extend life of upper knives.

(Continued on page 60)

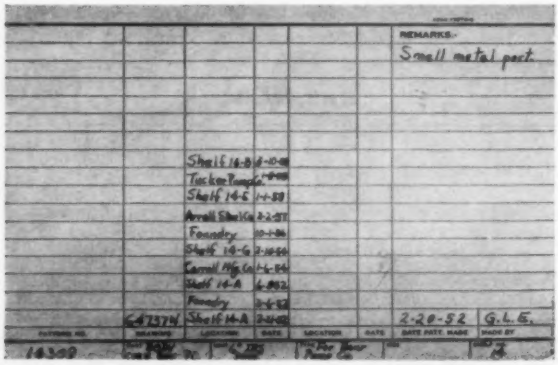
Systematic Foundry Pattern Storage System Saves $2500 Annually

PATTERN loss and handling damage is practically eliminated at the Andale Company, Lansdale, Pa., by storing all patterns on adjustable steel shelving with locations keyed in a comprehensive file card system. This system speeds pattern delivery and saves approximately $2500 a year in lost and damaged patterns.

Thousands of patterns are now stored safely and in a minimum of floor space on the steel shelving units. When the production department calls for a particular pattern, the pattern shop can deliver it immediately even though it may not have been used for a year or more.

Approximately 744 lineal feet of shelving provide 18,000 sq ft of storage space in the 65- by 130-ft small pattern storehouse. The shelving, manufactured by Penco Metal Products Division, Alan Wood Steel Company, consists of 248 open-type units, three feet square and eight feet three inches high. Units consist of posts, sway braces and shelves bolted together to form a continuous rack. All shelves are adjustable to accommodate patterns of any size.

Patterns are stored on numbered shelves with each section cross-referenced with a letter to pinpoint the exact location.



File card shows pattern and drawing number with shelf location. If the pattern is in use, card shows where it was sent.

For more facts circle 542 on Reply Card ——→

You find Gates Hose where anything flows
Mackinac Bridge, world's longest suspension bridge, connects upper and lower peninsulas of Michigan. Because reliability of equipment is an important factor in the grouting operations, Gates Water and Air Hoses were used.
PHOTOS COURTESY MACKINAC BRIDGE AUTHORITY
18 HB

Gates Air Hose helps build bridge "that couldn't be built"

TPA 304

Industry everywhere depends upon Gates Industrial Hose to provide air, water, steam, oil and suction for every type of application, including some of the toughest jobs in the world.

Actually there are *tens of thousands of miles* of Gates Hose in daily use — every type and size from air hose the diameter of a pencil to petroleum hose as big as the mains in city streets.

Back of the world-wide acceptance of Gates Hose is a continuing program of *specialized* hose research at the multi-million dollar Gates Research Center staffed by more than 200 chemists, physicists, engineers and technicians.

It is the aim of this *specialized* research to increase hose utility and life, and to lower industry's annual hose costs.

Because Gates Hose is so widely preferred, it is quickly available from leading distributors in all industrial centers in the United States and in 90 countries throughout the world . . . and its outstanding performance is guaranteed by the *World's Largest Maker of V-Belts.*

Gates 18HB Air Hose, with oil resistant tube and abrasion resistant cover, gives exceptional performance on all heavy duty air usage. This popular hose — one of many in Gates full line — is always available from your nearby Gates Distributor.

The Mark of Specialized Research

Gates

The Gates Rubber Company • Denver, Colorado

Gates Industrial Hose

Made in a Full Range of Types and Sizes

OPERATION—PRODUCTION

(O and P begins on page 58)

Each knife overlaps its driving slitter by about three sixty-fourths of an inch and is spring-loaded to provide constant tension. Too much overlap creates excessive dust from the shear.

Top knives range from six to eight inches in diameter when new and decrease in diameter as they are reground. The carbide bottom slitters range from six and one-half to twelve and one-quarter inches in diameter.

An immediate advantage resulting from the use of the carbide knives was the longer life experienced. Original steel slitters were lasting only two or three months before requiring regrinding. The carbide slitters have been working for two years and still show no sign of visible wear.

When the steel upper knives formerly operated against the steel slitters, they dulled rather quickly. Now there is a constant honing action of the steel knives against the carbide bottom slitters that maintains a keen cutting edge on the knives. Estimates indicate that there is at least 50 per cent longer life for the steel knives before resharpening is required.

Staples Clamp Glued Parts

AIR-DRIVEN staples have replaced clamps and other bonding devices used during gluing operations at the SS & S Manufacturing Co. Inc., Evansville, Indiana. Labor costs involved in clamping, nailing or other methods of bonding run from 30 to 50 per cent higher than for bonds made with air-driven staples.

Glued parts are stapled into position and held securely to permit subsequent operations to be performed immediately.

(Continued on page 62)

Rust-Proof Roller Conveyors Keep Packages Clean

COMBINING the advantages of stationary shelving, gravity-feed roller conveyors and mechanically driven belt conveyors, a new materials handling system installed at the National Biscuit Company plant, Cincinnati, Ohio, moves thousands of packages easier, faster and at lower cost.

Heart of the system is a triple-deck line of about 75 roller conveyors, arranged side by side at right angles to a moving conveyor. As stock arrives at the warehouse, each of the roller conveyors is loaded with a particular item. The conveyors remain idle, like stationary shelves, until load-out time each morning.

During this period of idleness the rollers are likely to pick up moisture from condensation. With carbon steel rollers, this would inevitably result in surface rust, with the hazard of marked and discolored packages.

To prevent rust marks on the packages, the rollers were made of Zincgrip steel tubing. This special tubing, furnished by Armco Steel Corporation, is made from hot-dipped zinc-coated steel strip and has a service-proved record of resistance to corrosion.

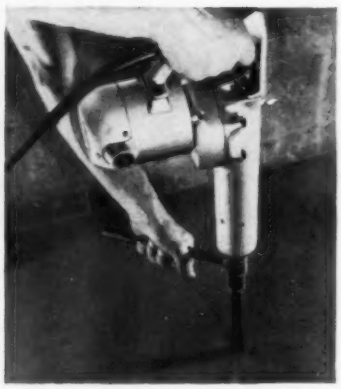
Slanting downward toward the moving belt conveyor, the roller conveyors keep a constant supply of each item within easy reach of the stock clerk, who single-handedly maintains a continuous flow of orders on the conveyor leading to the loading platform.

Each roller conveyor holds packages of a particular item waiting to be shipped out in this first-in, first-out system.

Orders are assembled by taking packages from roller conveyors and placing them on conveyor leading to truck dock.

Look what Black & Decker's 1⅛" Hammer can do for you!

BREAKING holes through concrete or brick; demolition work goes easier with bull point tool.



INSTALLING electric outlets in concrete is a cinch with a B&D Hammer.

TRIMMING excess metal or scaling after the job's done goes fast and easy with cold chisel.

MOUNTING electric signs, switchgear, etc. is fast work with powerful Hammer and star drill.

2,200 cutting blows a minute speed up electrical jobs

Here's the tool that helps you slash preparation time laying conduit in concrete floors and in scores of other jobs! Rugged Black & Decker Electric Hammers are *power*-packed to deliver thousands of hard, rapid, cutting blows to send your man-hours tumbling; output per worker climbing.

See for yourself what the B&D 1⅛" Hammer can do for you in drilling, digging, piercing, breaking, chiselling and dozens of other operations. Mail coupon for free demonstration or additional information. THE BLACK & DECKER MFG. CO., Dept. 0810, Towson 4, Md. (In Canada: Brockville, Ontario.)

Look Under TOOLS-ELECTRIC in Yellow Pages

Leading Distributors Everywhere Sell

B&D **Black & Decker**®

Quality Electric Tools . . . Power-built for top performance

MAIL TODAY FOR FREE DEMONSTRATION

THE BLACK & DECKER MFG. CO., Dept. 0810, Towson 4, Md.

☐ Please arrange a free demonstration of your 1⅛" Hammer
☐ Please send additional literature

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

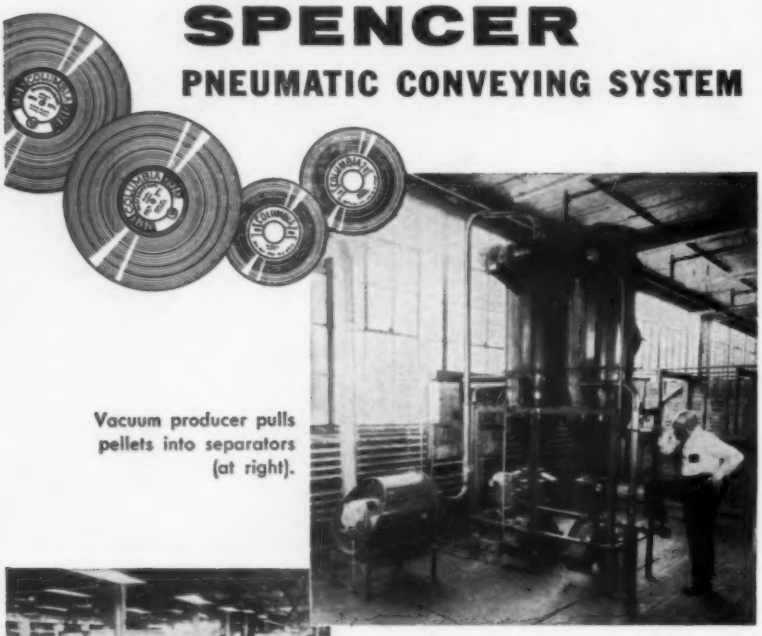
For more facts circle 543 on Reply Card

Sweet 1 production Music at Columbia Records Plant...

Thanks to a

SPENCER

PNEUMATIC CONVEYING SYSTEM



Vacuum producer pulls pellets into separators (at right).

Production line of record presses fed by Spencer system.

From plastic pellets to completed discs, there is no manual handling of materials here at the Columbia Records plant, Bridgeport, Conn.

Pellets are picked up at the pelletizer, conveyed to a large hopper. From there, material is blown through a piped circuit to small "feed" hoppers on each automatic record pressing machine.

Advantages of the Spencer system are many and measurable:

Savings on Material Handling Costs—Manual and mechanical hopper-loading is eliminated, man-power freed for productive tasks.

Increased Production—No "down time" on record presses due to lack of material.

No Contamination of Material—Dirt, metal chips, glass, etc. cannot enter the piped system.

For recommendations (and suggested piping lay-out) on a SPENCER system to solve your needs, write outlining your requirements.

Request Bulletin No. 143-B

The SPENCER TURBINE COMPANY
HARTFORD 6, CONNECTICUT

ALSO MANUFACTURERS OF: STATIONARY VACUUM SYSTEMS; PORTABLE VACUUM CLEANERS; BLOWERS

For more facts circle 544 on Reply Card

OPERATION—PRODUCTION

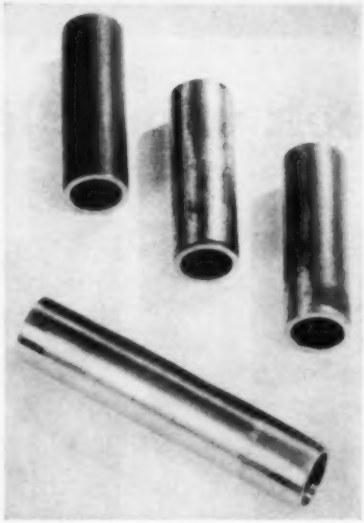
(O and P begins on page 58)

The addition of 14 air tackers, manufactured by the Fastener Corporation, Franklin Park, Ill., dispensed with slow methods of bonding small parts and allowed the assembly line to move smoothly without waiting for glue to set.

Wax-Base Coating Prevents Rust

RUST PREVENTIVES made with refined microcrystalline wax base and with inhibitors added have proved effective for protecting carbon and low alloy steel tubing at the Superior Tube Company, Norristown, Pa.

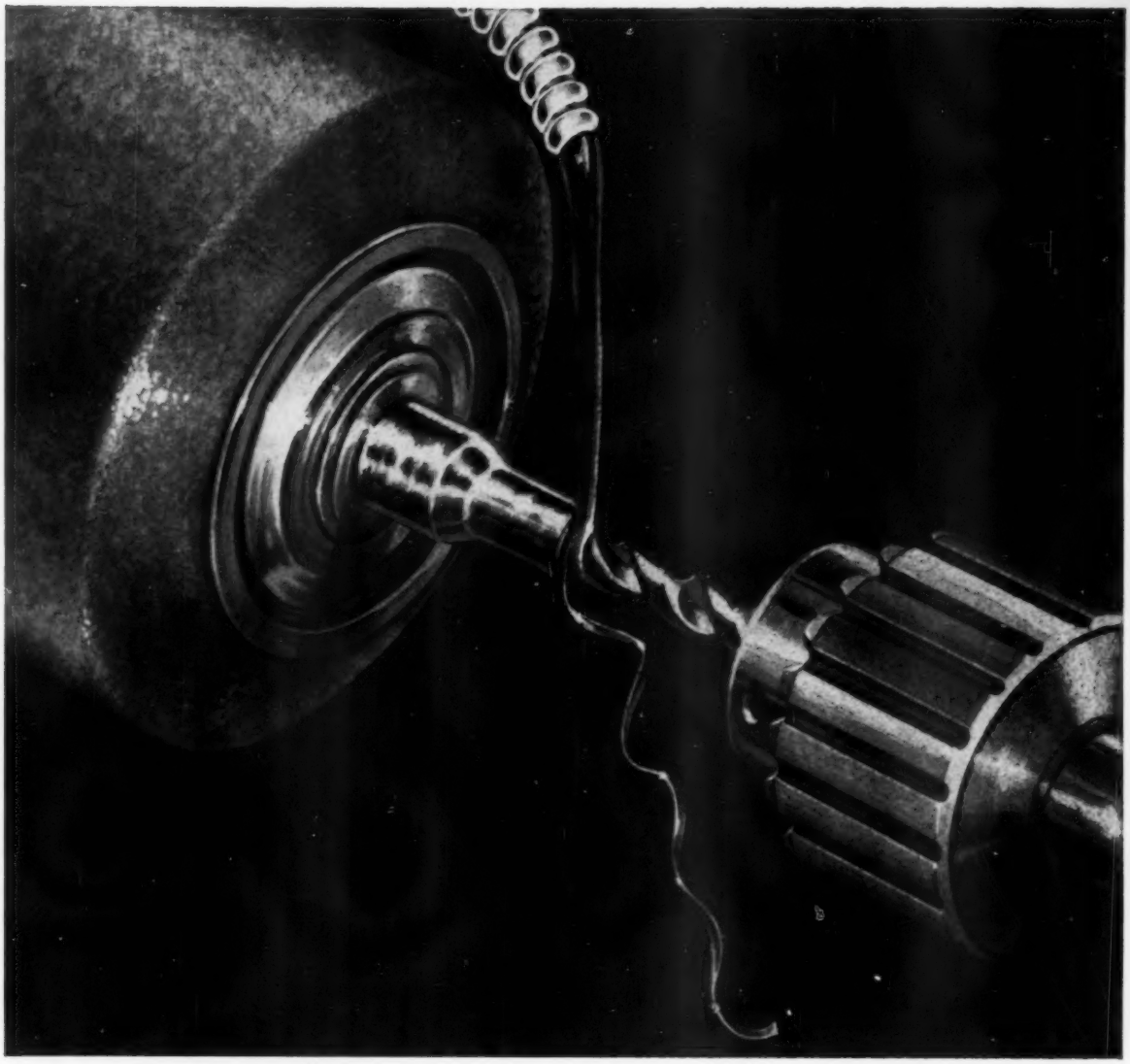
As part of its latest series of



After six weeks exposure to acid fumes, wax-coated sample at bottom shows no signs of rust. Rusted sample, at left, was not coated and two, at right, were coated with ordinary rust preventives.

tests on rust preventives, Superior's chemists placed coated carbon-steel tubing inside the mill in the vicinity of the acid house. Since fumes from the acid house are particularly corrosive, these test conditions are more severe than would be encountered in normal storage.

Tubing coated with the wax-base rust preventive showed no signs of rust staining after six to eight weeks exposure. Tubing coated with other commonly used



excellent visibility offers close working control

The transparency of Dortan cutting oils permits the machine operator to flood work and tool areas with a broad stream *without impairing visibility.* Clean working conditions permit easier gauging and measuring . . . assure finer finishes, increased output, fewer rejects.

Sulfur and other additives impart excellent machining properties to Dortan cutting oils. Smoking is minimized . . . low pour points make handling easy. Separation and settling are never problems. *Four* grades offer varying cutting strengths:

Dortan 41: General-purpose cutting oil – for most operations with fairly easily machined ferrous alloys.

Dortan 43: Moderate- to heavy-duty cutting oil for medium- to low-machinability steel or titanium.

Dortan 45: Highly compounded cutting oil with sulfur – will not stain copper or copper bearing alloys.

Dortan 50: Extremely heavy-duty active-sulfur-type oil – for steels of difficult machinability (as stainless and heat-resistant) and for internal broaching. Also excellent as form and thread grinding oil for soft, tough or stringy alloys.

Get complete technical data from the nearest Esso Standard Oil Company Division Office: Boston; Pelham, N.Y.; Elizabeth, N. J.; Bala-Cynwyd, Pa.; Baltimore; Richmond; Charlotte; Memphis; New Orleans.

Today—Oil Builds for your Tomorrow • Oil Progress Week, October 12-18.

DORTAN®

ESSO

ESSO RESEARCH works wonders with oil

For more facts circle 545 on Reply Card

No Tools Required... Fewer Parts to Handle

Compare Norgren with other makes of manual drain filters. All others require tools to take them apart... then there are a dozen or so loose parts—easily dropped and lost, and likely to be improperly reassembled. Not so with Norgren Filters. No tools are needed for maintenance and there are only four parts to reassemble. Maintenance is simple... an easy job for anyone. This means a big saving in maintenance time and money.

MAKE	NORGREN	A	B	C	D	E
LOOSE PARTS TO DISASSEMBLE	4	9	15	13	6	12
TOOLS REQUIRED FOR MAINTENANCE	NONE	Wrench	Wrench & Screw-driver	Screw-driver	Wrench	Wrench & Pliers
TOOL OPERATIONS REQUIRED	NONE	2	10	16	2	4

If it's Norgren... It's Dependable.

For complete information call your nearby Norgren Representative—or write for descriptive literature.

C. A. NORGREN CO.

3443 SOUTH ELATI STREET • ENGLEWOOD, COLORADO

For more facts circle 546 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 58)

rust preventives began to stain in four days to one week. Microscopic examination shows the wax film to be tighter than oil films, although the latter may seem to be continuous to the naked eye.

Shakeout Belt Beats the Heat

REINFORCED with glass fabric, a heat-resistant rubber conveyor belt is carrying foundry shakeout sand ranging in temperature from 350 F to 500 F. Installed two years ago at Texas Foundries, Inc., Lufkin, Texas, the belt has already lasted seven times longer than belts formerly used.

In this period, company engineers have estimated a savings of $3500 in belt replacement costs. In addition, the downtime losses, which previously cost two and one-half tons of production every time a belt required replacement, have been reduced.

Tests on foundry shakeout sand reveal temperatures ranging from 350-500 F.

The Solarflex belt, manufactured by B. F. Goodrich Company, is 25 ft long and 24 in. wide. It travels 80 fpm and carries 20 tons of hot shakeout sand per hour.

Truck-Crane Cuts Handling Costs

MOVING heavy turbine and generator components around plant yards and in and out of buildings always presents a problem in materials handling. Plant engineers of the Philadelphia Electric Com-

"Take a tip from me—

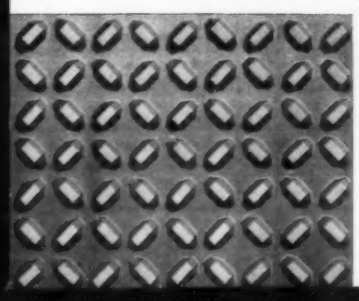
One slip can cost more than USS Multigrip"

USS* Multigrip Floor Plate is specifically designed to help protect you against accidents from slips and skids. It will pay you to examine your plant or shop for possible accident-prone areas that could be made safe with Multigrip.* For it provides traction for feet and wheels at all times—in all directions.

Where floor surfaces take a pounding, USS Multigrip supplies a rugged, long-lasting cover. It's made from heavy-duty plate that will last for years without maintenance. Studded with hundreds of risers in a symetrically designed pattern, their flat tops provide a greater bearing surface, reducing wear and prolonging the non-skid properties. Rugged though it is, it's comfortable to walk on and safe, wet or dry.

You save money on cleaning, too! A quick once-over with a broom or hose will get it spick and span. There are no pockets to hold dirt. Water drains quickly in any direction. Get USS Multigrip from our local distributor near you.

Sold by leading distributors from coast to coast



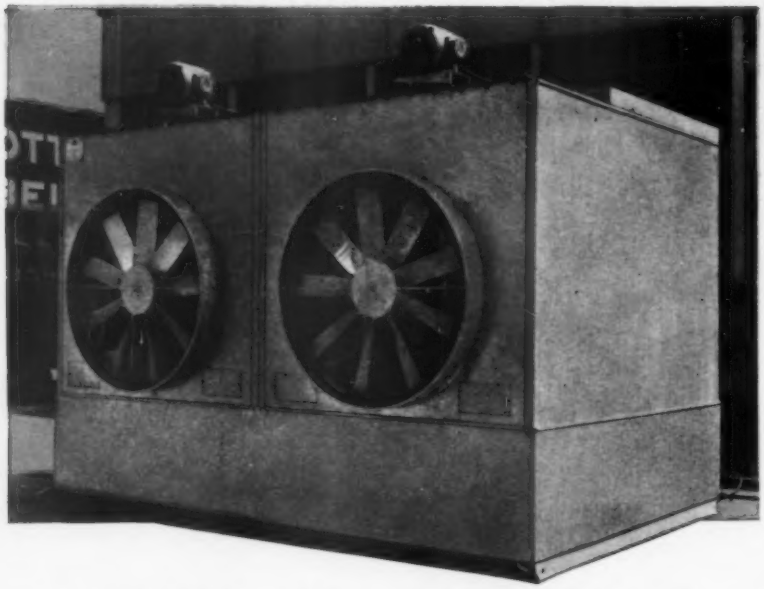
United States Steel Corporation – Pittsburgh
Tennessee Coal & Iron – Fairfield, Alabama
Columbia-Geneva Steel – San Francisco
United States Steel Supply – Warehouse Distributors
United States Steel Export Company

USS United States Steel

*TRADEMARK

For more facts circle 547 on Reply Card

NEW LOW-COST APPROACH TO PROCESS WATER COOLING



COST OF WATER CONSERVATION IS DOWN! The initial investment, installation and operation costs of these new dual model Aquatowers is so low that no plant can afford a "hot spot" that wastes 200 to 400 gallons of water per minute. They make water wasting impractical, unprofitable.

These large capacity packaged cooling towers reach the job completely assembled, ready for work—require only simplest wiring and piping. Maintenance is just minutes per month.

Operational flexibility of these 2-fan Aquatowers is outstanding. They match their performance to any climatic demand for cooling welding equipment, moulding presses, quenching operations or any process demand your plant presents. For refrigeration, these new models are nominally rated at 80, 100 and 120 tons, respectively.

If plant operation is your responsibility, learn why these large Aquatowers really make water conservation good business for *your* plant. Call the Marley engineer in your city or write to

Aquatower is the Registered Trademark of

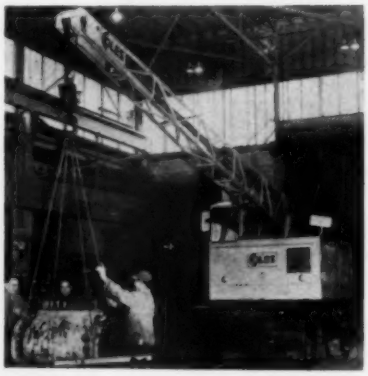
MARLEY **The Marley Company**

Kansas City, Missouri

For more facts circle 548 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 58)



Diesel-electric power provides all the advantages of electric crane operation on this self-propelled truck-crane unit.

pany solved this problem by using a self-propelled Coles truck-crane to provide needed flexibility.

Equipped with a Hercules diesel engine driving a generator, the all electric crane has separate electric motors controlling the various crane motions. The unit is operated by one man and is a full-circle slewing design with a cantilever type boom.

Aluminum Welding Gun Saves Time

WELDING time has been reduced from 15 minutes to two minutes per corner in the manufacture of refrigerator truck bodies at the Amerio Refrigeration Equipment Company, Cliffside Park, N. J. The cast aluminum corners of the truck roofs are welded to the ex-

Feeding wire up to 900 ipm, gun weighs under four pounds with reel of wire.

"Buffalo" Resin-Bonded Fiber Glass Fume Fan

CORROSION-CONTROL PROBLEMS?

SOLVE THEM WITH THESE SPECIAL "BUFFALO" UNITS

The broad line of "Buffalo" equipment for corrosion control, plus our 80 years of engineering experience in this field, insures you of the most effective solution of your corrosive fume problems.

Whatever your specific needs, you will find the *right* "Buffalo" product with the *right* protective coating and/or corrosion-resistant parts to fill that need.

Contact your nearby "Buffalo" Engineering Representative, or write us outlining your problem. We will be glad to provide you with a prompt, practical, economical solution.

"Buffalo" Type "FG" Fume Fans provide superior chemical resistance to a wide variety of corrosives, including acids, salts, gases, organic materials. Temperature applications range up to 225°F.

The fan housing is formed of resin-bonded fiber glass. All exposed areas of the carefully-balanced steel rotor are encased in thick fiber glass. The "FG" is available in standard capacities up to 34,000 cfm at pressures to 10" static.

For full details, including chemical resistance table, write for Bulletin FI-511.

"Buffalo" Cast Iron Exhausters, widely-used throughout the chemical process industries, are engineered to operate under the most extreme corrosive conditions.

Husky cast iron housings, plus cast inlet cones with integral inlet vanes, guide air smoothly into the wheels. The result is the low-turbulence air flow inherent in this high-efficiency design. Non-overloading is insured, regardless of system pressure.

Three arrangements are available: direct motor drive, separate belt drive or a package unit with adjustable pitch V-belt drive and motor mounted on adjustable base rails.

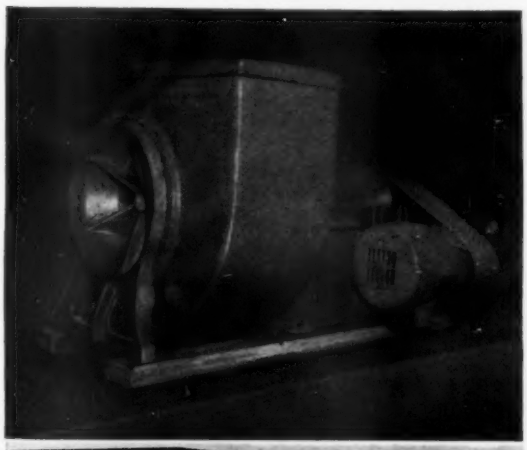
For full information on "Buffalo" Cast Iron Exhausters, contact your nearest "Buffalo" Representative or write us direct.

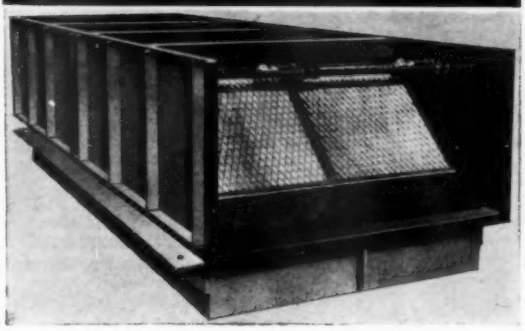
"Buffalo" Gas Absorbers are designed for highly efficient removal and/or recovery of soluble gases, vapors and mists from exhaust systems before discharge to the atmosphere. Absorption is accomplished when the contaminant is completely in solution. This is accomplished by means of an absorbent liquid sprayed on a series of fiber cells.

Field performance tests prove that efficiency of "Buffalo" Gas Absorbers ranges up to 99.8%. Applications fall into two categories: removal of low concentrations from stack gas effluents for prevention of atmospheric pollution, and the absorption of process or off-gases containing sufficient material to make reutilization economically feasible.

Bulletins AP-225 and AP-2500 will guide you to the proper "Buffalo" Gas Absorber to solve your contamination problem. Write for it today.

EVERY "BUFFALO" PRODUCT FEATURES THE "Q" FACTOR — the built-in Quality which provides trouble-free satisfaction and long life.





Top *"Buffalo" Cast Iron Exhauster*

Bottom *"Buffalo" Gas Absorber*

BUFFALO FORGE COMPANY

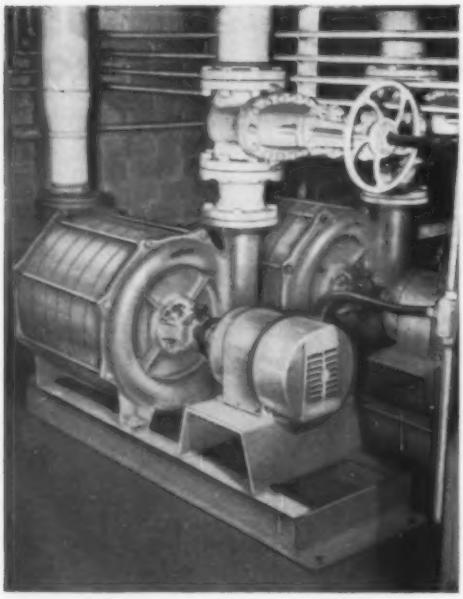
BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING • AIR CLEANING • AIR TEMPERING • INDUCED DRAFT • EXHAUSTING
FORCED DRAFT • COOLING • HEATING • PRESSURE BLOWING

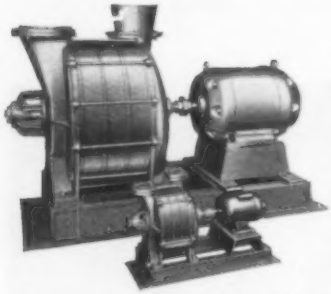
For more facts circle 549 on Reply Card

FOR LOW PRESSURE AIR REQUIREMENTS . . .

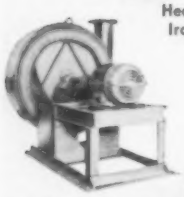


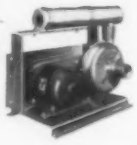
use a low air pressure source

LAMSON BLOWERS



Heavy Duty Cast Iron, Models M and C





Heavy Duty Fabricated, Model B and Model HR, with V-Belt Drive

It doesn't pay to operate a costly high pressure air system with reducing valves for low pressure air. For low pressure air requirements, use Lamson Blowers. You get air at the right pressure for the job—you don't pay for pressure you don't use!

Lamson Blowers deliver clean, dry air or gas—without pulsation. Pressure always remains nearly constant at all capacities, with HP proportional to actual volume delivered. Don't compress, then decompress! Use the right pressure from the start!

Send for free booklet: *"The Right Pressure for the Job!"* Pictures and diagrams show how Lamson Blowers save you money. It illustrates both cast iron and fabricated models.

Clip to Your Letterhead: Please send me a free copy of "The Right Pressure for the Job!"

LAMSON

LAMSON CORPORATION

1008 Lamson Street, Syracuse 1, N. Y.

Plants in Syracuse and San Francisco • Offices in All Principal Cities

For more facts circle 550 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 58)

truded roof rails using an Aircomatic MIGet gun developed by Air Reduction Sales Company.

The cast aluminum corners and the extruded roof rails are both one-eighth inch thick. The truck body requires eight welded joints, each about 12 in. long. Total savings in time over the previous welding method is 104 minutes per truck body.

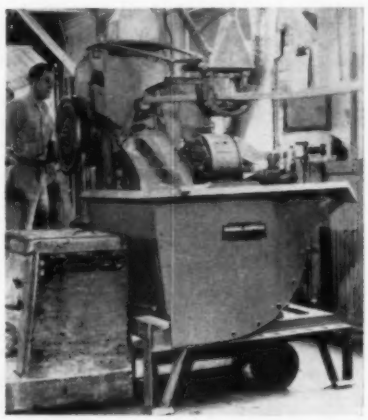
A spool of welding filler wire is housed in the gun together with the drive motor and drive rolls for feeding the wire to the joint. The unit is particularly suited for making short welds in hard-to-reach places.

Hopper Reduces Handling Costs

MOVING six tons of lead chips daily between two production operations located 200 yards apart presented a material handling problem for The Okonite Company, Passaic, N. J., manufacturers of electrical cable.

Using one-half yard capacity Roura self-dumping hoppers solved the problem and resulted in extra storage area. The large capacity of the hoppers required fewer trips per day, with a resultant labor savings.

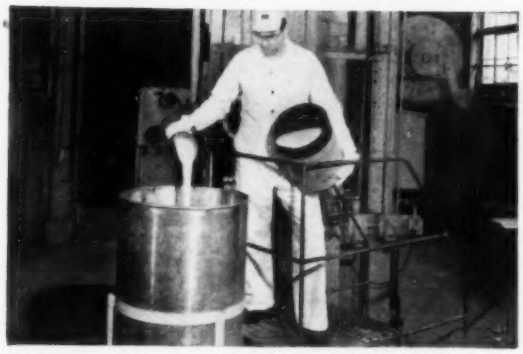
Since the hoppers can be tiered four or five high without spillage, floor area previously required for lead storage can be utilized for other purposes.



After vulcanizing, lead sheath is stripped from cable, falls into hopper and is then moved to melting furnace for reuse.

Here are the reasons why—

DRY-ACID CLEANERS based on Du Pont Sulfamic Acid are gaining favor in industrial equipment cleaning

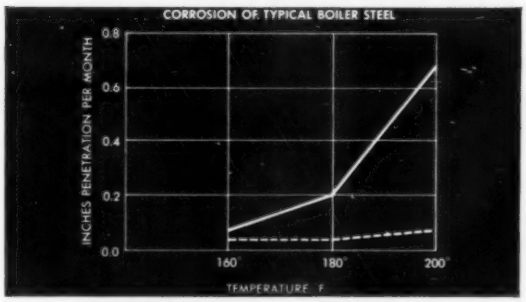


SAFER TO HANDLE—Dry-acid cleaners are dustless, free-flowing powders that *handle* dry. There's no danger of spillage, spatter of liquids or broken bottles.

EASIER TO USE—No siphoning or cumbersome pouring of liquid acid—just scoop or shovel dry acid into make-up tank.

LOWER HANDLING COSTS—Packaged in convenient, easily handled and stored, disposable drums in a variety of sizes. *100-lb.* drum is more than equal to one carboy of 18° hydrochloric acid (gross weight 192 lbs.).

NO HAZARDOUS FUMES—Dry-acid compounds are non-fuming, produce no corrosive gases . . . dry *or* in solution. Special precautions necessary in handling ordinary acids are eliminated.



_____ *Inhibited hydrochloric (5% HCl, by weight)*
- - - - - - *Inhibited Sulfamic Acid (7% by weight)*

LESS CORROSIVE—Cleaners based on Du Pont Sulfamic Acid form solutions equal to hydrochloric acid in penetrating power, yet are far less corrosive (as shown by graph above).

Cleaners based on Du Pont Sulfamic Acid are ideal for removing hard-water scale and other mineral deposits from industrial equipment such as air conditioning and ice-making units, food-processing vessels, steam boilers, milk evaporators and pasteurizers, marine evaporators and heat exchangers.

We'll gladly send you additional information on sulfamic-acid-based cleaners and the names of formulators who offer these cleaning compounds. E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Dept., Room N-2533, Wilmington 98, Del.

E. I. du Pont de Nemours & Co. (Inc.)
Grasselli Chemicals Dept., Rm. N-2533
Wilmington 98, Delaware

Please send me ( ) free booklet about dry-acid cleaners based on Du Pont Sulfamic Acid. ( ) Names of formulators who offer these cleaning compounds.

*Name*_____

*Firm*_____ *Title*_____

*Address*_____

*City*_____ *State*_____

DU PONT REG. U.S. PAT. OFF. **SULFAMIC ACID**

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

For more facts circle 551 on Reply Card

These 5 "tips" can help you end sump pumping problems *once and for all*

Here are 5 ways to prevent sump pumping trouble before it starts *and* cut maintenance time—with Goulds Fig. 3171 vertical centrifugal sump pump.

1. Put the pump at the proper depth without paying the extra cost for special shaft lengths and pipe columns. Goulds Fig. 3171 fits any pit from 2 to 20 feet deep—comes in standard lengths of 6 inch increments.

2. Maintain pump alignment permanently by means of male and female fits on Goulds Fig. 3171.

3. Prevent damage by fumes, weather, moisture with these features of the Fig. 3171: completely sealed-in upper bearing; Falk all-steel couplings; special vapor-proof construction (upon request).

4. Make external adjustments for impeller clearance with Goulds Fig. 3171—to save time, trouble. Replace upper bearings without disturbing pump or piping merely by removing the motor and coupling from above.

5. Adapt to changing pit depths without ordering a whole new unit. You can adapt this pump *in the field* for new depth or pump ratings simply by ordering a few new parts.

You can get Goulds Fig. 3171 as a single or duplex unit—completely assembled with sump cover—for wet or dry pits, with capacities to 1080 GPM, heads to 290 ft. For more details, contact your Goulds dealer, or write for your copy of Bulletin 726.2.

GOULDS PUMPS, INC.

Dept. PE-10 Seneca Falls, N. Y.

For more facts circle 552 on Reply Card

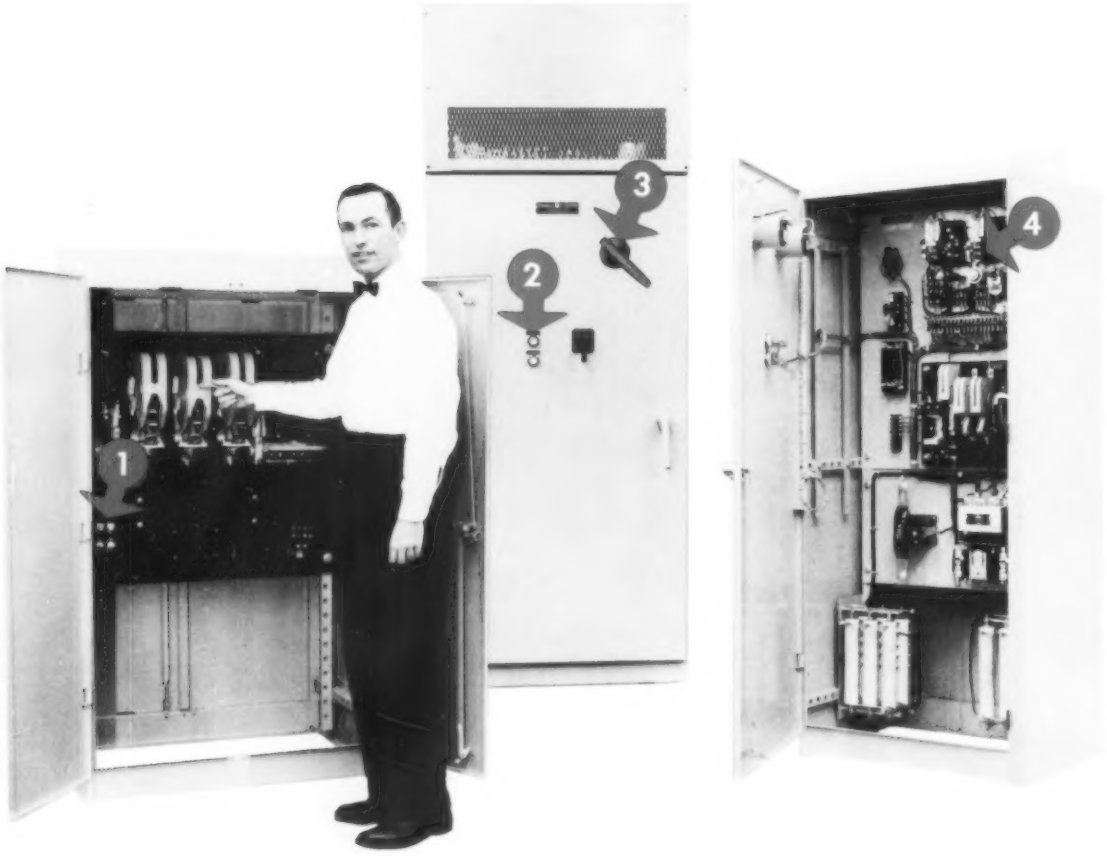
For more facts circle 553 on Reply Card——→

IN 96 SECONDS, *see how every member of General Electric's motor-control family offers feature after feature for . . .*

Greater protection of your equipment and personnel

GENERAL ELECTRIC

Get greater protection of equipment and personnel with



LOW-VOLTAGE INDIVIDUAL STARTERS

For squirrel-cage, wound-rotor and synchronous motors

1. **OVERLOAD RELAYS** on General Electric's individual motor controls constantly protect the motor against damage from overloads.
2. **UNDERVOLTAGE PROTECTION** is provided by momentary-contact pushbuttons on applications where automatic restarting after power loss is not desired. Undervoltage release by maintained-contact pushbuttons is available for applications where automatic restarting is desired.
3. **SHORT-CIRCUIT PROTECTION** against faults up to 100,000 amperes can be provided. Fuses, circuit breakers, and fuse-breaker combinations are available.
4. **SYNCHRONOUS MOTOR PROTECTIVE SYSTEM** allows maximum utilization of the motor, yet gives full protection against out-of-step operation with field applied. Squirrel-cage winding has graduated protection that prevents overheating during starting, yet does not cause unnecessary tripping.

Write for bulletin GEA-6584 to Sect. 783-8, General Electric Co., Schenectady, N. Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC

LOW-VOLTAGE MOTOR CONTRO

For flexible grouped control of mot

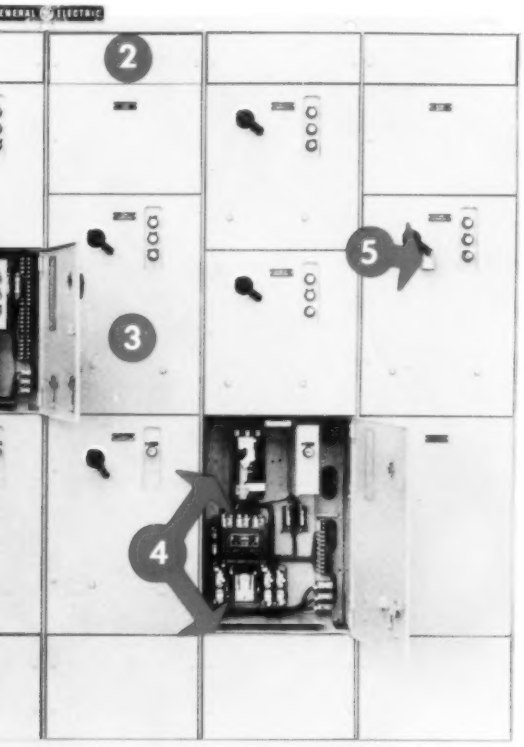
1. **INTERLOCKED DOOR HANDLES** automatically operate the breaker or fused switches and de-energize the starter units when handles are turned to "OPEN" position, thus the doors cannot be opened when the starter is energized.
2. **SHORT-CIRCUIT PROTECTION** up to 100,000 amperes is available with fuses or reactor in incoming line.
3. **STURDY ENCLOSURE** is constructed of bolted sheet-metal with an "I-beam" frame. This protects starters

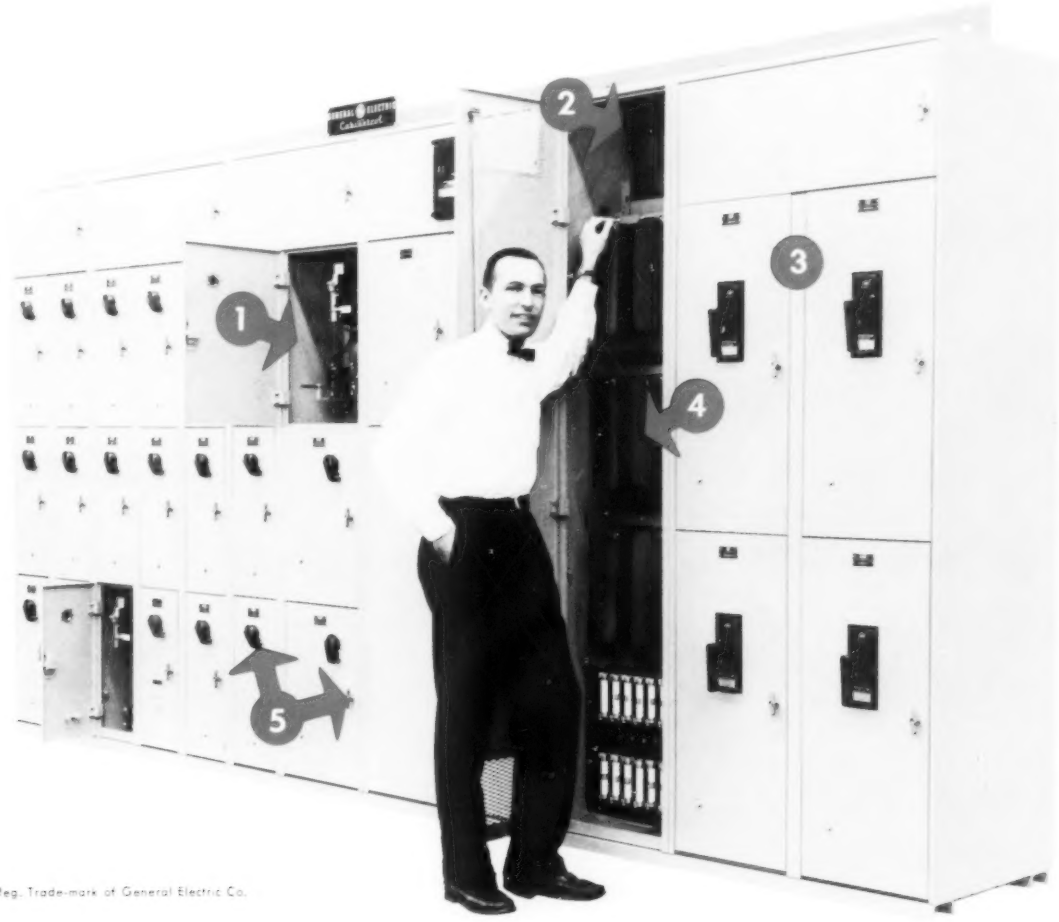
Write for bulletin GEA-4979 to Sect. 783-8, Gene

Progress Is Our Most Im

GENERAL

with these features of General Electric motor control





*Reg. Trade-mark of General Electric Co.

NTROL CENTERS

of motors up to 400 hp

and internal wiring from mechanical damage. Full-length floor sill adds to strength of enclosure.

4 **ISOLATED STARTER COMPARTMENTS** are separated from the main power bus and other starter compartments by horizontal and vertical metal barriers.

5 **LOCKING DEVICE** on compartment handle can be used to lock starters in position to prevent unauthorized operation and to prevent starter from being energized during maintenance.

783-8, General Electric Co., Schenectady, N. Y.

Most Important Product

ELECTRIC

LOW-VOLTAGE CABINETROL* POWER CENTERS

For custom-engineered grouped control of motors up to 900 hp

1 **METAL BARRIERS** between starter compartments protect personnel during inspection and maintenance. Starter compartments are isolated from each other and from the main bus.

2 **RUGGED ENCLOSURE** of these General Electric power centers is constructed of welded one-piece sheet steel to protect starters and internal wiring from mechanical damage.

3 **SHORT-CIRCUIT PROTECTION** up to 100,000 amperes is available for the power center in any one of three systems: fully rated, cascade, or backup.

4 **CAPACITOR BANKS** for power-factor correction can be provided to protect against excessive power losses.

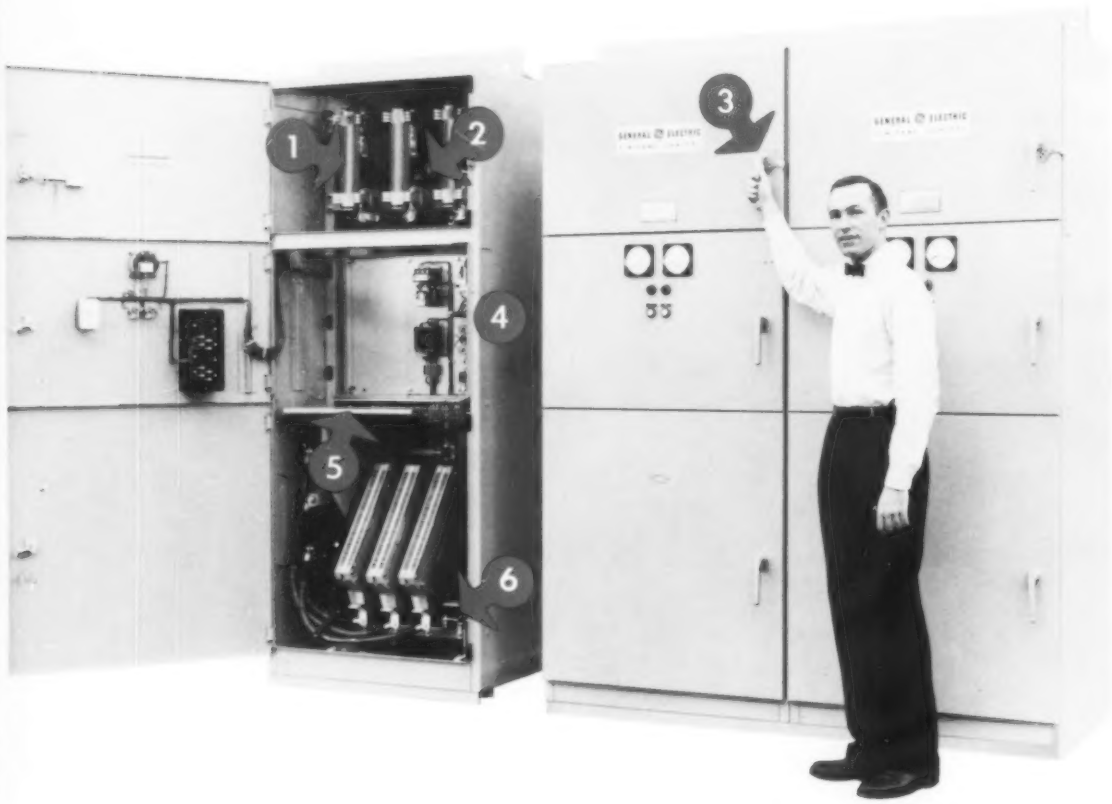
5 **INTERLOCKED DOOR HANDLES** on the Cabinetrol power centers require that the starter unit is de-energized before door can be opened. Breaker handle can be locked in position and each compartment has a separate cylinder lock to prevent unauthorized entry.

Write for bulletin GEA-3856 to Sect. 783-8, General Electric Co., Schenectady, N. Y.

Progress Is Our Most Important Product

GENERAL ELECTRIC

and personnel with these features



*Reg. Trade-mark of General Electric Co.

MEDIUM-VOLTAGE LIMITAMP* STARTERS

For individual or grouped control of motors up to 3000 hp

1. **HIGH-INTERRUPTING CAPACITY** fuses limit fault current within ¼-cycle. Limitamp starters have short-circuit capacities up to 150,000 KVA at 2300 volts, and 250,000 KVA at 4000 or 4600 volts, 60 cycles.
2. **VISUAL CHECK** of three-phase isolating switch shows personnel that unit is isolated from high-voltage power.
3. **ISOLATING SWITCH** is operated from outside the enclosure. High-voltage compartment doors cannot be opened until starter has been isolated from incoming power.
4. **MOTOR IS PROTECTED** against overload by ambient-compensated overload relays. All Limitamp control components are co-ordinated to withstand the stresses of short circuits.
5. **METAL BARRIERS** separate the high-voltage and the low-voltage compartments.
6. **INTERLOCK SYSTEM** on this General Electric control prevents operation of the isolating switch until the contactor has been completely de-energized.

Write for bulletin GEA-6331 to Sect. 783-8, General Electric Co., Schenectady, N. Y.

FOR MORE INFORMATION AND APPLICATION ASSISTANCE on any of G.E.'s motor controls, contact your G-E Apparatus Sales Office.

LIFT

GENERAL ELECTRIC

AMERICA ALWAYS OUTPERF

We grow so fast our goals are exceed

7 BIG REASONS FOR CONFIDENCE IN AMERICA'S FUTURE

1. More People—Four million babies yearly. U. S. population has *doubled* in last 50 years! And our prosperity curve has always followed our population curve.

2. More Jobs—Though employment in some areas has fallen off, there are 15 million more jobs than in 1939—and there will be *22 million more* in 1975 than today.

3. More Income—Family income after taxes is at an all-time high of $5300—is expected to pass $7000 by 1975.

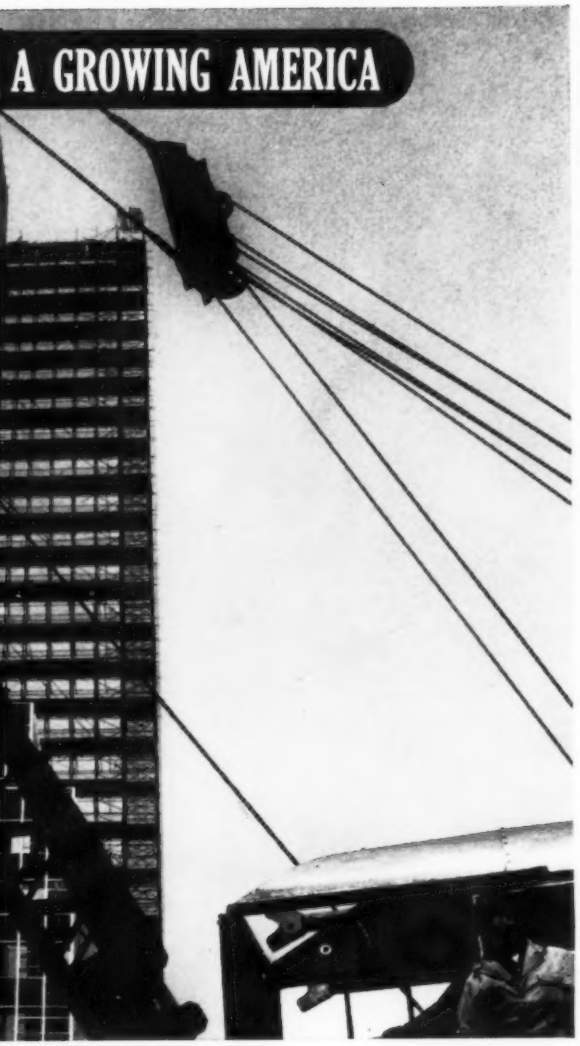
4. More Production—U.S. production *doubles* every 20 years. We will require millions more people to make, sell and distribute our products.

5. More Savings—Individual savings are at highest level ever—*$340 billion*—a record amount available for spending.

6. Mor
in mor

7. Mo
than $
ble eq
tunitie

FREE
bookle
Americ
facts. F
TISING
New Yo



PERFORMS ITS PROMISES

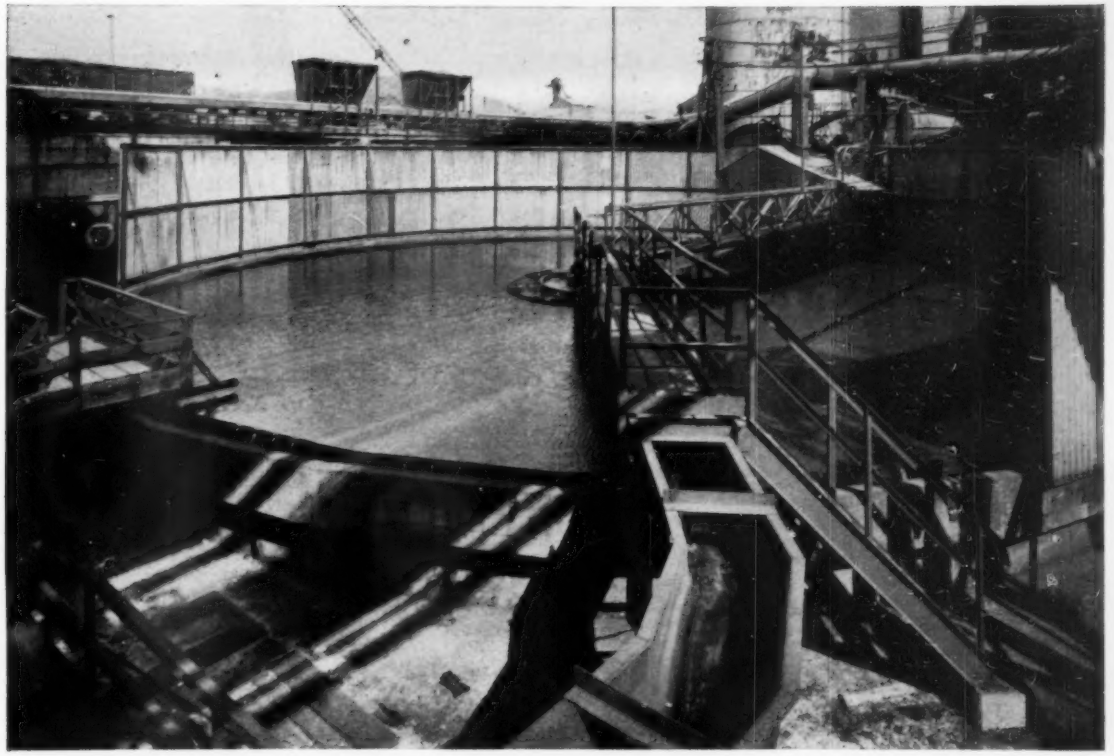
exceeded soon after they are set!

6. More Research—*$10 billion* spent each year will pay off in more jobs, better living, whole new industries.

7. More Needs—In the next few years we will need more than *$500 billion* worth of schools, highways, homes, durable equipment. Meeting these needs will create new opportunities for everyone.

Add them up and you have the makings of another big upswing. Wise planners, builders and buyers will act *now* to get ready for it.

FREE! Send for this new 24-page illustrated booklet, "Your Great Future in a Growing America." Every American should know these facts. Drop a post card today to: THE ADVERTISING COUNCIL, Box 10, Midtown Station, New York 18, N. Y.



Stop Costly Waste Treatment Corrosion with the Proven Protection of PITT CHEM® Coatings

Typical Waste Treatment Applications of PITT CHEM Coatings

Alkaline Waste Holding Tanks
Specify PITT CHEM TARSET®

★

Concrete Waste Water Lines
Specify PITT CHEM 101

★

Ferric Chloride Storage Tanks
Specify PITT CHEM TARSET

★

Evaporator Cooler Ducts
Specify PITT CHEM 101 or 105

HALF-WAY corrosion control methods are practically worthless for the protection of your waste treatment equipment. That's why corrosion engineers in plant after plant have turned to tough, heavy-duty *Pitt Chem* Tar Base Coatings for long-term, economical protection of iron, steel and concrete equipment against severest waste treatment corrosion.

These durable, thick-film coatings outlast ordinary paints many times over—yet they cost no more per gallon. They can be applied by spray, brush or roller—by your own men.

Let us show you how *Pitt Chem* Tar Base Coatings can help you save thousands of dollars that you may have been passing off as unavoidable depreciation.

● PITT CHEM Industrial Coatings are available through leading Industrial Distributors. See the "Yellow Pages."

COAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

For more facts circle 555 on Reply Card

Here's a quick way to beat construction costs—

USS Galvanized Steel Sheets

You've probably seen it happen in your own plant: Expansion is a must . . . but the construction time and cost estimates are so high that they discourage expansion plans. Not so when the plans call for a building clad with USS Galvanized Steel Sheets.

Compare prices . . . USS Galvanized Steel Sheets cost less than other types of metal roofing and siding. They are easy to put up. Once the framework is erected, it takes only a few days to cover an entire building with USS Galvanized Steel Sheets. No special construction team has to be hired. Regular construction crews or your own plant maintenance crew can do the job.

The strength of the steel and the formed pattern of the sheet make a weathertight covering that will not buckle, bulge, or sag. The building *stays* tight because bolt and nail holes in *steel* will not easily enlarge and let the sheets work themselves loose.

If you plan to build, or repair buildings at your plant, do it the quick, low-cost way with USS Galvanized Steel Sheets. They are available in a variety of sizes and patterns. Ask your steel supplier about USS "Storm Seal," USS V-5 Crimp, or USS Corrugated Galvanized Steel Sheets.

USS and "Storm Seal" are registered trademarks

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

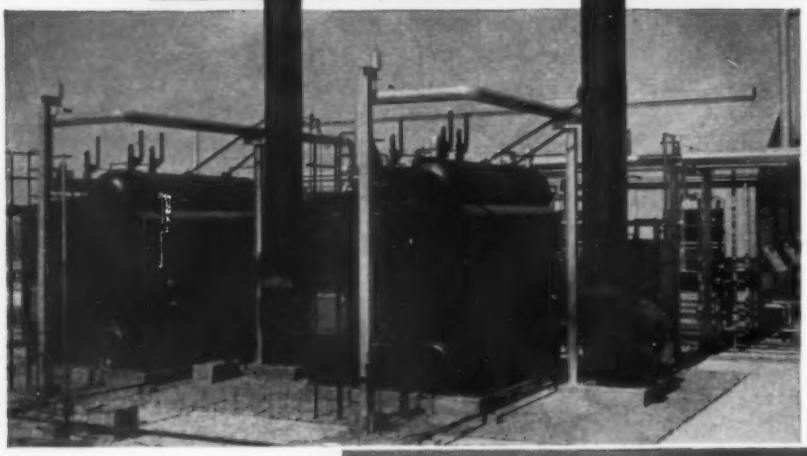
United States Steel

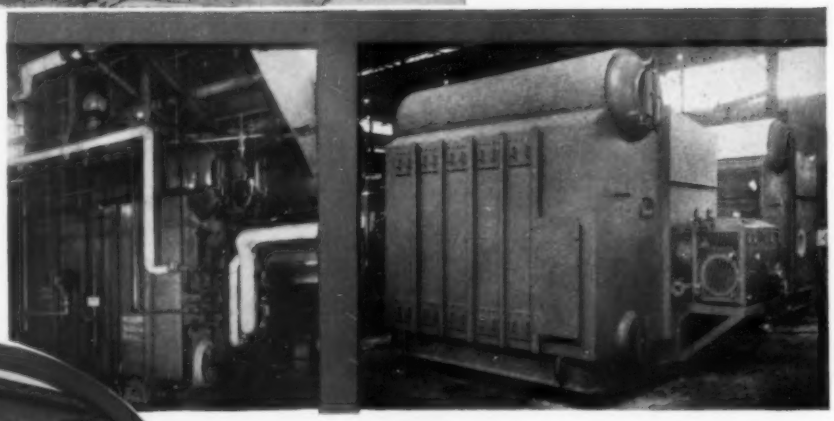
For more facts circle 556 on Reply Card

Vogt

Package

STEAM BOILERS *give* versatility with economy

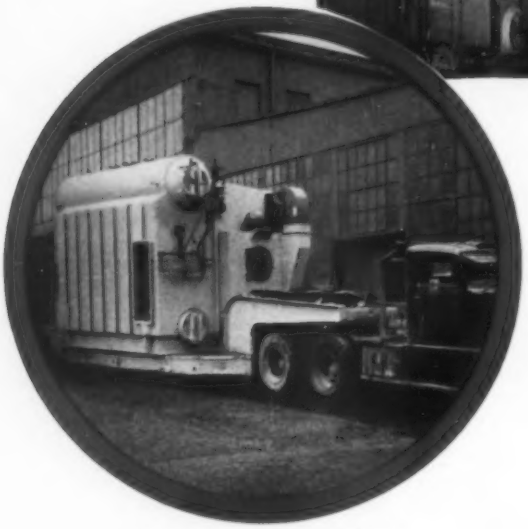




Above: Two units serve a gas pipeline company.

Left: Installation in fibre box-board plant.

Right: Unit for a leading soap manufacturer.



Enroute to an office building.

FOR POWER, PROCESS OR HEATING

Available in capacities from 10,000 to 50,000 pounds steam per hour in three standard pressures of 175, 250 and 375 pounds per square inch gage, factory assembled.

Write for Bulletin PSG-2, Dept. 24-A-BPLE

HENRY VOGT MACHINE COMPANY, Louisville, Ky.

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Camden, N. J., St. Louis, Charleston, W. Va., Cincinnati.

OTHER VOGT PRODUCTS:

DROP FORGED STEEL VALVES, FITTINGS, FLANGES AND UNIONS
PETROLEUM REFINERY AND CHEMICAL PLANT EQUIPMENT
HEAT EXCHANGERS • ICE MAKING & REFRIGERATING EQUIPMENT

For more facts circle 557 on Reply Card

CONSTRUCTION BRIEFS — a review of fundamentals for the plant engineer

Prepared by B. A. Wasil, Structural Engineer

DESIGNING IN REINFORCED CONCRETE PART VI

THE BEAM AND SLAB system is the more common type of reinforced concrete floor system. Here beam and slab are poured together forming a single monolithic assembly. The beam in this system then is considered and designed as a Tee-beam rather than a rectangular beam. Although all the design equations developed in the previous Briefs were for rectangular beams, we shall see how they can be used in the design of Tee-beams.

Because of the monolithic nature of reinforced concrete floor systems, most Tee-beams are continuous over a number of columns or girders rather than a single simple span.

Design of Slab

1. Loads

Since the long direction of the slab is more than two times the short direction, this slab will be considered a one-way slab with main reinforcing running in the short direction. We can then assume a design of a continuous rectangular beam that is 12 in. wide.

L.L. = 150 lb/ft
D.L. = 50 lb/ft (est. 4-in. slab)
Total load 200 lb/ft

2. Shear

Where we have a continuous beam or slab the code allows the use of simplified coefficients to determine values of shear and moment, if adjacent spans are approximately equal and where the unit live load does not exceed three times the unit dead load.

Thus:

Shear in end members at the first interior support:

$$V = 1.15\ \frac{wl'}{2}$$

Where l' is the clear span between supports. If we assume the beams to be 12 in. wide, then $l' = 9$ in., and

$$V = 1.15\ \frac{200 \times 9}{2} = 1035 \text{ lb}$$

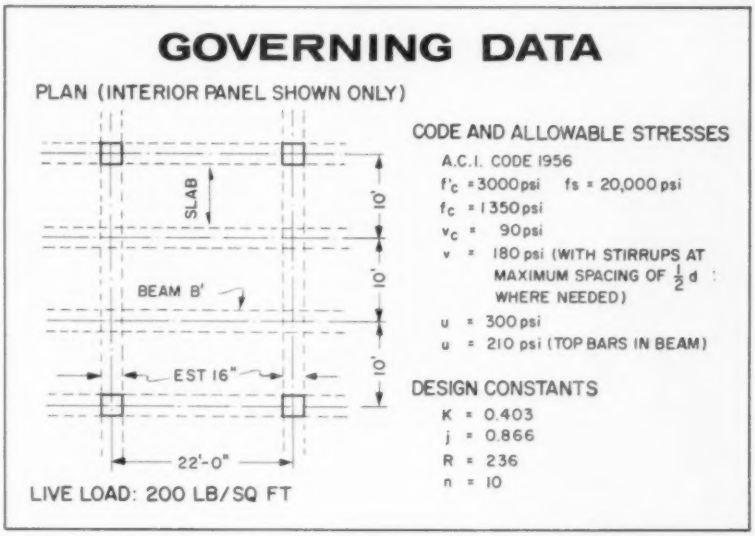


Fig. 1. Design sketch and basic data for solution of beam and slab floor system.

Shear at all other supports,

$$V = \frac{wl'}{2}$$

$$V = \frac{200 \times 9}{2} = 900 \text{ lb}$$

3. Moments

The coefficients for moments for slabs are:

Positive moment at end span, if end is integral with the support, and we shall assume the slab is integral with a spandrel beam:

$$M = \frac{1}{14}\ wl'^2$$

$$M = \frac{1}{14} \times 200 \times (9)^2 = 1158 \text{ ft-lb}$$

Positive moment, interior spans:

$$M = \frac{1}{16}\ wl'^2$$

$$M = \frac{1}{16} \times 200 \times (9)^2 = 1012 \text{ ft-lb}$$

Negative moment at face of all supports:

$$M = \frac{1}{12}\ wl'^2$$

$$M = \frac{1}{12} \times 200 \times (9)^2 = 1350 \text{ ft-lb}$$

4. Design for compression.

$$bd^2 = \frac{M}{R} \quad \text{(Design Equation)}$$

Design for maximum moment:

$$12d^2 = \frac{1350 \times 12}{236}$$

$$d^2 = 5.72 \text{ sq in.}$$

$$d = 2.4 \text{ in.}$$

Assuming 4 in. as the minimum total slab thickness, we use d= 3.0 in., and 1.0 in. for clear cover, plus ½ bar thickness.

5. Check shear.

$$v = \frac{V}{bjd} \quad \text{(Design Equation)}$$

Table I. Area, in square inches, of groups of various sizes of reinforcing bars.

Bar Designation	NUMBER OF BARS 2	3	4	5	6	7	8	9	10
4	0.39	0.58	0.78	0.98	1.18	1.37	1.57	1.77	1.96
5	0.61	0.91	1.23	1.53	1.84	2.15	2.45	2.76	3.07
6	0.88	1.32	1.77	2.21	2.65	3.09	3.53	3.98	4.42
7	1.20	1.80	2.41	3.01	3.61	4.21	4.81	5.41	6.01
8	1.57	2.35	3.14	3.93	4.71	5.50	6.28	7.07	7.85
9	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
10	2.53	3.79	5.06	6.33	7.59	8.86	10.12	11.39	12.66
11	3.12	4.68	6.25	7.81	9.37	10.94	12.50	14.06	15.62

Check with maximum shear value:

$$v = \frac{1035}{12 \times .866 \times 3} = 33.2 \text{ psi,}$$

less than the 90 psi allowed.

6. Design for tension.

$$A_s = \frac{M}{f_s jd} \text{ (Design Equation)}$$

Positive steel at end span:

$$A_s = \frac{1158 \times 12}{20{,}000 \times .866 \times 3}$$

$= 0.268$ sq in./ft

Use No. 4 bars on 9-in. centers.

Positive steel at all interior spans:

$$A_s = \frac{1012 \times 12}{20{,}000 \times .866 \times 3}$$

$= 0.234$ sq in./ft

Use No. 4 bars on 10-in. centers.

Negative steel at all supports:

$$A_s = \frac{1350 \times 12}{20{,}000 \times .866 \times 3}$$

$= 0.312$ sq in./ft

Use No. 4 bars on 7½-in. centers.

For the sake of simplicity and uniformity of construction, No. 4 bars on 7½-in. centers will be used throughout.

7. Bond Check

$$u = \frac{V}{\Sigma_o jd} \text{ (Design Equation)}$$

$$u = \frac{1035}{2.5 \times .866 \times 3} = 159.2 \text{ psi,}$$

less than the 300 psi allowed.

8. Temperature Steel

$A_t = 0.002$ bd

$A_t = 0.002 \times 12 \times 3.0 = 0.072$ sq in./ft.

Use No. 3 bars on 18-in. centers.

The exact dimensions of bar bends and cut-offs can be determined after the beam is designed and the beam width determined.

The next Brief will continue the design of the floor system by designing the Tee-beam.

Table II. Perimeter, given in inches, of groups of various sizes of reinforcing bars.

Bar	NUMBER OF BARS								
Designation	2	3	4	5	6	7	8	9	10
4	3.1	4.7	6.2	7.8	9.4	11.0	12.6	14.1	15.7
5	3.9	5.9	7.8	9.8	11.8	13.7	15.7	17.7	19.5
6	4.7	7.1	9.4	11.8	14.1	16.5	18.8	21.2	23.6
7	5.5	8.2	11.0	12.7	16.5	19.2	22.0	24.7	27.5
8	6.3	9.4	12.6	15.7	18.9	22.0	25.1	28.3	31.4
9	7.1	10.6	14.2	17.7	21.3	24.8	28.4	31.9	35.4
10	8.0	12.0	16.0	20.0	23.9	27.9	31.9	35.9	39.9
11	8.9	13.3	17.7	22.2	26.6	31.0	35.4	39.9	44.3

Table III. Perimeter, in inches per foot, of reinforcing bars in concrete slabs.

Spacing	BAR DESIGNATION								
in.	3	4	5	6	7	8	9	10	11
3	4.7	6.3	7.8	9.4	11.0	12.6	14.2	—	—
3½	4.0	5.4	6.7	8.1	9.4	10.8	12.2	13.7	—
4	3.5	4.7	5.9	7.1	8.3	9.4	10.6	12.0	13.3
4½	3.1	4.2	5.2	6.3	7.3	8.4	9.5	10.6	11.8
5	2.8	3.8	4.7	5.7	6.6	7.5	8.5	9.6	10.6
5½	2.6	3.4	4.3	5.1	6.0	6.9	7.7	8.7	9.7
6	2.4	3.1	3.9	4.7	5.5	6.3	7.1	8.0	8.9
6½	2.2	2.9	3.6	4.4	5.1	5.8	6.5	7.4	8.2
7	2.0	2.7	3.4	4.0	4.7	5.4	6.1	6.8	7.6
7½	1.9	2.5	3.1	3.8	4.4	5.0	5.7	6.4	7.1
8	1.8	2.4	2.9	3.5	4.1	4.7	5.3	6.0	6.6
9	1.6	2.1	2.6	3.1	3.7	4.2	4.7	5.3	5.9

Table IV. Areas, in square inches per foot, of reinforcing bars in concrete slabs.

Spacing	BAR DESIGNATION								
in.	3	4	5	6	7	8	9	10	11
3	0.44	0.78	1.23	1.77	2.40	3.14	4.00	—	—
3½	0.38	0.67	1.05	1.51	2.06	2.69	3.43	4.34	—
4	0.33	0.59	0.92	1.32	1.80	2.36	3.00	3.80	4.68
4½	0.29	0.52	0.82	1.18	1.60	2.09	2.67	3.37	4.17
5	0.26	0.47	0.74	1.06	1.44	1.88	2.40	3.04	3.75
5½	0.24	0.43	0.67	0.96	1.31	1.71	2.18	2.76	3.41
6	0.22	0.39	0.61	0.88	1.20	1.57	2.00	2.53	3.12
6½	0.20	0.36	0.57	0.82	1.11	1.45	1.85	2.34	2.89
7	0.19	0.34	0.53	0.76	1.03	1.35	1.71	2.17	2.68
7½	0.18	0.31	0.49	0.71	0.96	1.26	1.60	2.02	2.50
8	0.17	0.29	0.46	0.66	0.90	1.18	1.50	1.89	2.34
9	0.15	0.26	0.41	0.59	0.80	1.05	1.33	1.69	2.08

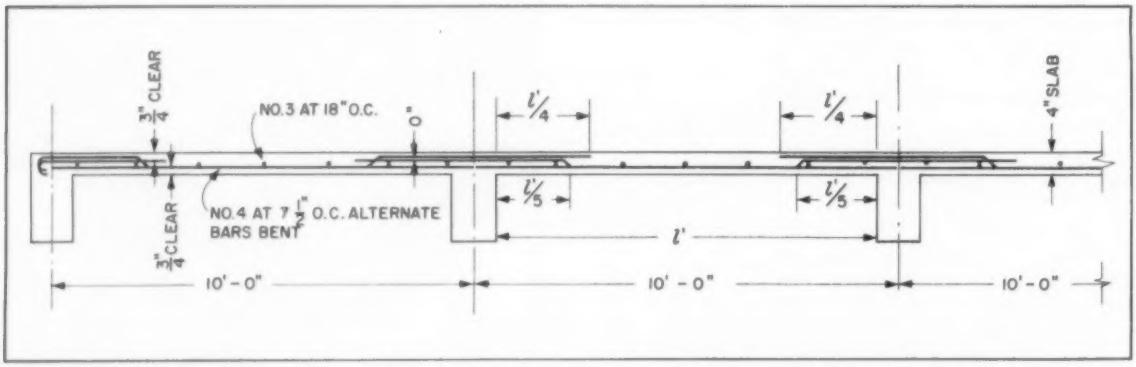
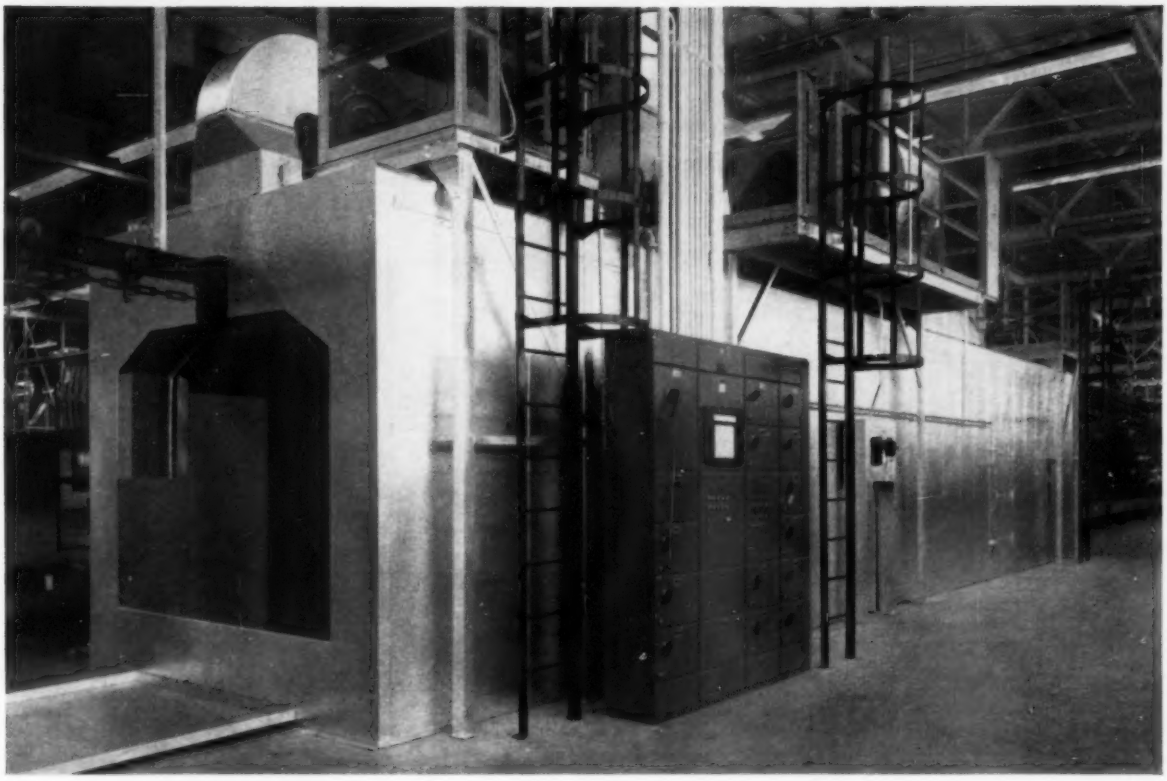


Fig. 2. Preliminary slab design, showing locations and sizes of bars. Exact dimensions will depend on design width of beam.

FINISHING SYSTEMS...



MODERN PRODUCTION FINISHING METHODS Require ULTRAMODERN FINISHING EQUIPMENT!

The function of the modern Dry-Off Oven, pictured above, is to thoroughly dry metal parts after passing through the Cleaning and Rust Proofing Machine in a Complete Mahon Finishing System installed in an Automobile parts plant.

When you have a finishing problem, you, too, will want to discuss methods, equipment requirements and possible production layouts with Mahon engineers . . . you'll find them better qualified to advise you, and better qualified to do the initial planning and engineering which is so vital to a properly coordinated production finishing system.

THE R. C. MAHON COMPANY • Detroit 34, Michigan

SALES-ENGINEERING OFFICES in DETROIT, NEW YORK and CHICAGO

Engineers and Manufacturers of Complete Conveyorized Finishing Systems; Metal Parts Washers, Metal Cleaning and Rust Proofing Machines, Conveyorized Cleaning and Pickling Machines; Dry-Off Ovens, Cooling Tunnels, Spray Booths, Electrostatic Spray Enclosures, Flow Coaters, Dip Coaters, Finish Baking Ovens, and Paint Stripping Equipment; Core Ovens, Soldering Ovens, Heat Treating and Quenching Equipment for Aluminum and Magnesium; Dust and Fume Control Installations, and Many Other Units of Special Plant and Production Processing Equipment.

See Sweet's Plant Engineering File for Information and Representative Installations, or Write for Catalogue A-658

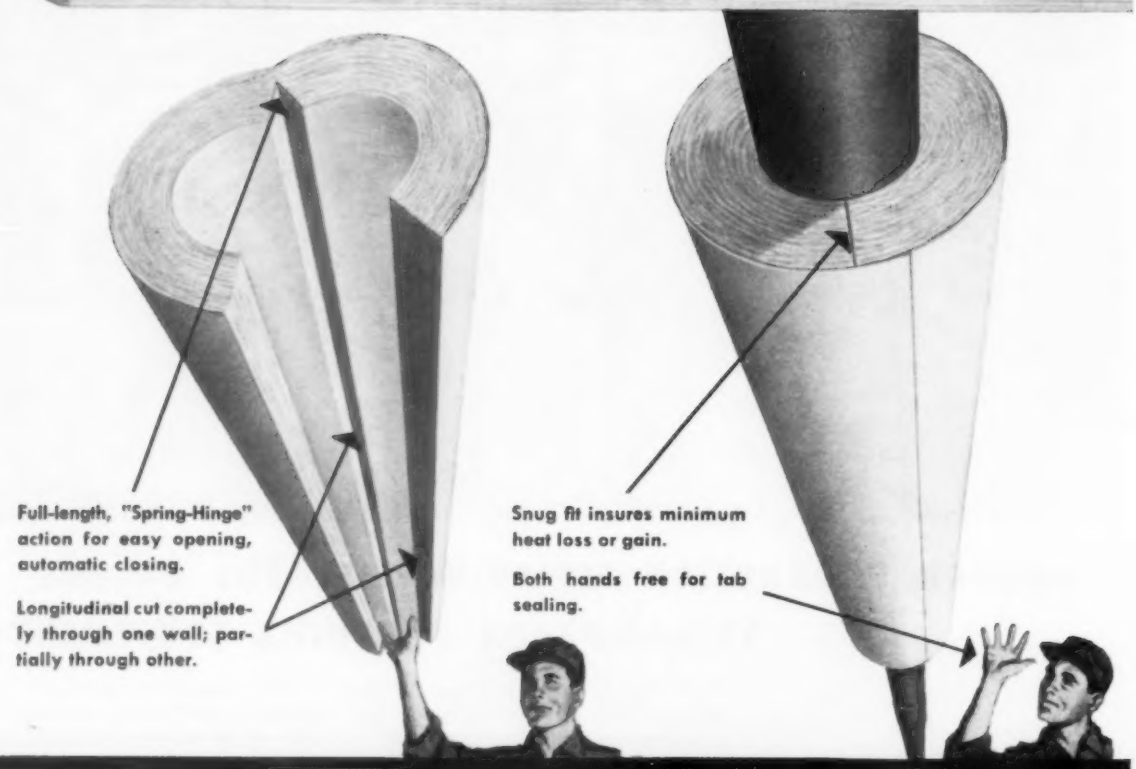
. . . the **EXPERIENCE** that goes into the **PLANNING** and **ENGINEERING** of **MAHON EQUIPMENT** is the item of **GREATEST VALUE** to **YOU!**

MAHON

For more facts circle 558 on Reply Card

MICRO · LoK

PIPE INSULATION*



Full-length, "Spring-Hinge" action for easy opening, automatic closing.

Longitudinal cut completely through one wall; partially through other.

Snug fit insures minimum heat loss or gain.

Both hands free for tab sealing.

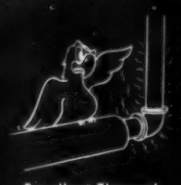
HERE'S A "BIRD'S-EYE" VIEW OF MICRO·LoK:

"Spring-Hinge" Action

One-piece construction and automatic closing feature introduces new savings in application costs; increases efficiency of workers by quickly freeing hands for sealing tabs and other operations.

Light in Weight

Three foot section of 1" thick MICRO•LoK for fitting 2" pipe weighs ¼ lb. L.F.— only ½th the weight of insulations which require more thickness to do the same job.



Excellent Thermal Performance

Made of finer, longer fibers, it has efficiency equal to or better than commonly used insulations. Temperature limit is 350° F. — unaffected by sub-freezing temperatures.

*PATENTS APPLIED FOR

©1958 L·O·F Glass Fibers Company

Look to L·O·F Glass Fibers for the NEW things in fiber glass

Another first from L·O·F Glass Fibers Company

for better performance and faster application

featuring full-length, "Spring-Hinge" action

1. The *first* one-piece, full-length "Spring-Hinge" action for easy opening and automatic closing.

2. The *first* fiber glass pipe insulation that permits easy cutting and fitting of the inside diameter around couplings, unions, pipe hangers and other irregularities.

The L·O·F Glass Fibers' process permits production of all standard wall thicknesses —especially ½" and ¾" walls—for all pipe and copper tubing sizes.

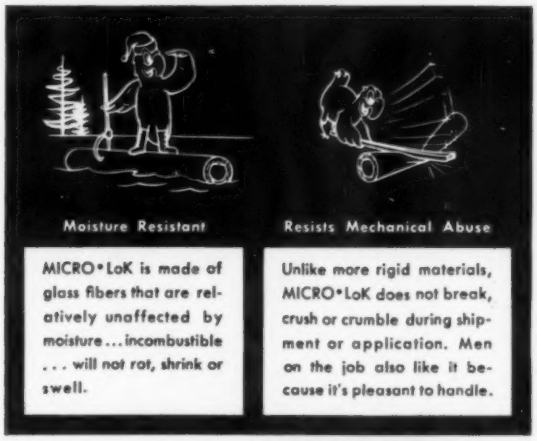
OPENS EASILY—CLOSES AUTOMATICALLY

EASY FITTING TO IRREGULAR PLACES

FASTER APPLICATION AT LOWER COST

RESISTS BREAKAGE AND CRUMBLING

SUPERIOR THERMAL EFFICIENCY


Moisture Resistant
MICRO•LoK is made of glass fibers that are relatively unaffected by moisture... incombustible ... will not rot, shrink or swell.
Resists Mechanical Abuse
Unlike more rigid materials, MICRO•LoK does not break, crush or crumble during shipment or application. Men on the job also like it because it's pleasant to handle.

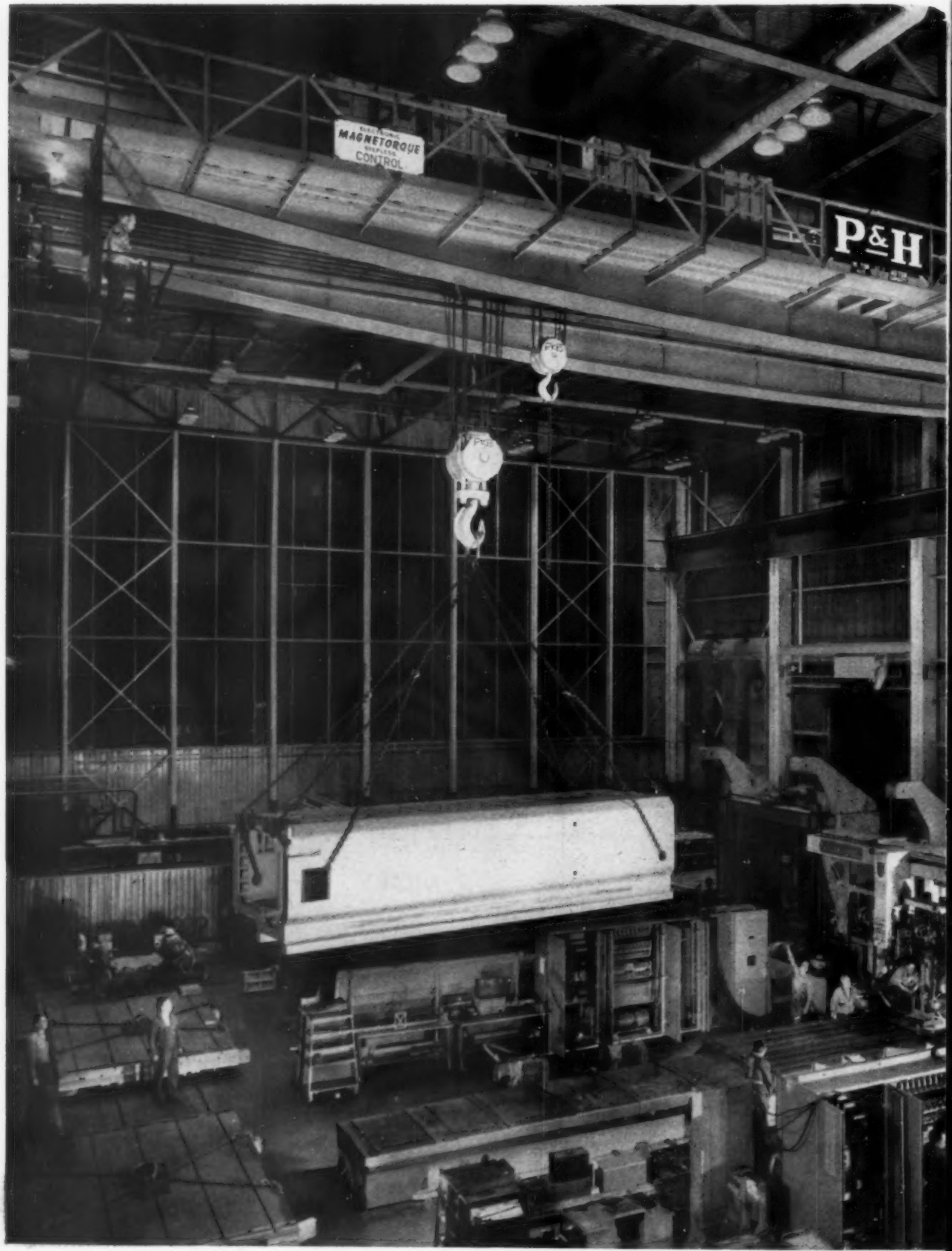
MICRO·LoK Pipe Insulation is available in factory applied jackets—including canvas, vapor barriers, flame resistant—for all operating conditions, whether hot or cold, concealed or exposed, indoor or outdoor.

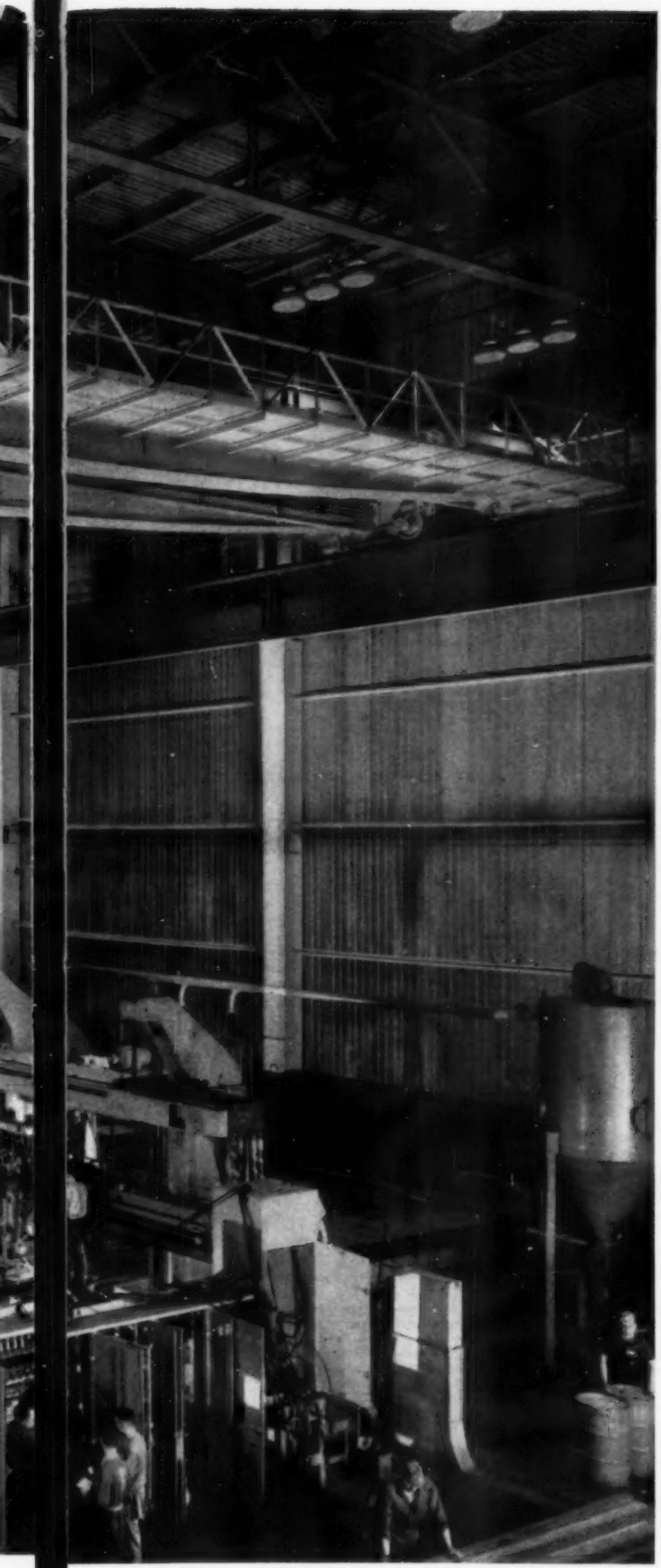
For more information on sizes, recommended thicknesses and application, *write: L·O·F Glass Fibers Company, Dept. 67-108, 1810 Madison Avenue, Toledo 1, Ohio.*

L·O·F GLASS FIBERS COMPANY

TOLEDO 1, OHIO

For more facts circle 559 on Reply Card


MAGNETORQUE
CONTROL
P&H



It's the CONTROL that determines whether your crane is modern!

...and P&H Electronic "Stepless" Control is the newest development in overhead crane controls. It's a remarkable crane control that provides smoother operation and more precise speed regulation. Operators can select exactly the *right* speed for any lifting and transporting movement, without being limited to "fixed" speeds.

You get a maintenance bonus in P&H Electronic Control, too. It's far simpler than previous crane controls, with fewer wearing parts to replace... or keep in inventory! The same control unit fits any size crane, and can be applied to modernize A-C cranes of *any* make.

You cannot afford to pass up this major improvement without a careful look. Be sure that P&H Electronic "Stepless" Control is included in your next crane inquiry. Dept. 125 C, Harnischfeger Corp., Milwaukee 46, Wisconsin.

HARNISCHFEGER

P&H .. quality and service for 74 years

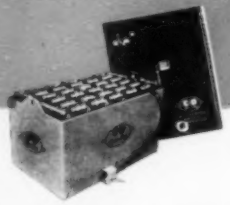
For more facts circle 560 on Reply Card

The battery that makes the difference . . .

C & D Slyver-Clad® provides needed extra energy to move mountains of cereal to America's breakfast tables

MORE POWER FOR QUAKER OATS

Food warehousing calls for all the most modern, efficient, and dependable material handling methods. Here at The Quaker Oats Company's four-year-old 168,000 square-foot Shiremanstown (Pa.) warehouse, electric industrial trucks bear the brunt of the lifting, lugging, stacking, and loading burden. Continuously loading and unloading 30 railroad cars, handling thousands of cars a year, keeps Quaker Oats' battery-electric trucks on the run. Credit is due the company's highly efficient scheduling, modern maintenance program, and modern, extra-energy C & D *Slyver-Clad*® lift truck batteries.



MODERN MATERIALS HANDLING

The warehouse operates on two shifts. Working on incentive basis, each lift truck driver is assigned a railroad car to load or unload. Palletized loads range between 1500 and 1800 lbs. Battery-electric trucks glide by — clean, quiet, odorless—providing the utmost in performance, efficiency, dependability, and safety . . . with no exhaust fumes to contaminate the air and foodstuffs.

MODERN MAINTENANCE

One key to this highly successful operation is The Quaker Oats Company's well-planned preventive maintenance program. Only minimum periodic maintenance is required on the electric trucks. Easily "refueled," trucks are merely backed up to the chargers. While others sleep, the C & D *Slyver-Clad* batteries are charged automatically from 11:00 P.M. to 7:00 A.M.—and the trucks are ready for another day's work.

MODERN BATTERIES TO MATCH

Second key to success in this outstanding material handling operation: C & D *Slyver-Clad* batteries. Modern plant — modern handling — modern batteries. Exclusive *Hi-Impac* jars and covers guard against breakage. Time-tested Five-Fold *Slyver-Clad* plate construction keeps "active materials" at work—for extra power . . . prevents "shedding"—to give extra life, extra dependability, and lowest cost. *For details, send for Bulletin IT-528.*

C&D BATTERIES, INC.
of Conshohocken, Pa. ... Attica, Ind.

Since 1906

Sales and Service Offices in Principal Cities from Coast to Coast

Manufacturers of *Slyver-Clad* ® Industrial Batteries • PLASTICELL and PLASTICELL ® Batteries for Communications, Control and Auxiliary Power • Producers of *Autolay* * Silicon Chargers

* Trademark

For more facts circle 561 on Reply Card

WHAT'S JUST AHEAD IN THIS ISSUE?

- WATER IS A problem in every plant—be it conservation, waste or what have you. At Philip Morris it was a problem of a lot of water, a lot of tax. To alleviate their water consumption, the company installed six cooling towers. Tower site selection and installation presented several problems. Turn the page to see how they were solved.

- DRILLING ONE or a thousand different pieces is no problem when the machine operates by punched tape control. Such a numerical control setup is working for Hughes Aircraft Company. To see if this equipment will fit your operation, turn to the article on page 94.

- ANY BIG PLANT projects can be bottlenecks or can work out very smoothly. It all depends on the plant engineer. There are a number of factors you should set straight before the program can get rolling. They are listed on page 103 and will guide you on the next project.

- SELECTING THE RIGHT steam trap size can be a snap. All you need is a chart. The one appearing on page 108 will tell you which size to use when determining weights of condensate to be expected from heating liquids by means of submerged heat transfer surfaces.

- CAN YOU GIVE irrefutable proof to general management in your company that that 50-year-old vertical boring mill is costing the firm money and should be replaced? Plant Engineer Butler of Struthers Wells Corp. shows how his careful analysis of obsolescence, wear, productive capacity and maintenance points the way to intelligent capital spending by his firm. Read the article starting on page 110.

- WHAT CAN BE done to rehabilitate concrete structures that have spalled, worn or eroded to what seems, visually, an unrepairable state? One case study, starting on page 116 of this issue, shows how such repairs were made on a baffle wall and retaining wall. To complicate the situation, both walls were under water a considerable portion of the day, necessitating close coordination between the owners and contractor. To find out how it was done, read the article, "Concrete Structure Repair."

- ADJUSTABLE SPEED drives are being called upon to add more flexibility to a plant's conveyor system. Versatility is also possible in the form of an automatic control, a speed regulated or a synchronized system. It all depends on which one best fits your needs. More information about these drives and what they can do for you appears on page 124.

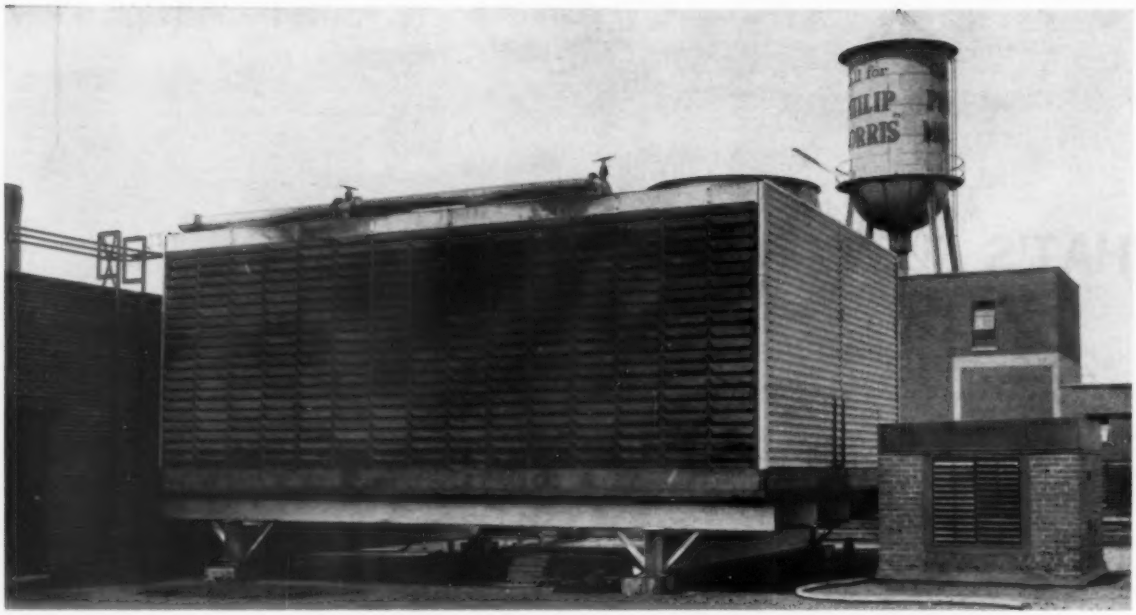


Fig. 1. Close-up view of the largest cooling tower installed at the Philip Morris plant to alleviate their water problem.

HERE'S HOW COOLING TOWERS SOLVED PLANT'S WATER PROBLEMS

By B. H. GRIESBACH, Engineer, Philip Morris, Inc., Louisville, Kentucky

ONCE YOU start talking to plant engineers about water, you will find that most of them have some sort of water problem. And, these water problems are just about as varied as the colors on a paint selection chart.

Philip Morris' water problems came in several shades and colors. We were short on water supply from our own deep wells. Water purchased from the city of Louisville was costly. Water returned to the city's sewer system was also costly.

In short, we had water problems.

The city of Louisville levies a sewer tax. This tax is based on 50 per cent of the original water purchased either from the city or that obtained from other sources, such as privately owned wells. If 1000 gallons of water are supplied to a consumer the sewer tax is levied on 500 gallons being disposed of to the city sewers. It is easy to see from this that large users of water are faced with two problems: a high initial cost and a high cost to dispose of it.

We were concerned with two water problems. The high costs, and the shortage of supply from our own wells. We had operated four deep wells for a number of years, as well as purchasing large quantities of water from the city. Between the cost of the purchased city water and the money spent on sewer tax, Philip Morris was paying the city in excess of $16,000 per year.

In the manufacture of cigarettes large quantities of water are used. Process steam, cooling processes, water used for drinking and sanitary purposes all combined add up to a sizable amount. The water problem burst into the foreground as a result of our air conditioning system and brought the problem to a head.

A water shortage in our plant air conditioning system meant a reduction in efficiency of the condensers, possible dirty condenser tubes and numerous other problems. Our wells in which the water level had dropped became a problem child. Small amounts of sand and small stones began showing up. Cleaning of condenser tubes became a steady job.

Our Engineering Department was presented with the problem of correcting the situation.

First step in the solution to this water problem was to make a complete study of where we were using water; and, after using it, what was the disposal problem?

Summer time operation called for larger amounts of water, as well as larger quantities for disposal. Air conditioning in the plant was the big water user.

Approximately 65 per cent of the cigarette plant is air conditioned and this is in the production area. The offices and laboratories are also air conditioned, but these areas are handled by individual area units. Our engineering study showed we were using in the neighborhood of 1,500,000 gallons of water per day in the summer months and the greater part of this water went directly to the sewer.

The survey pointed up the need for some means of water conservation. Cooling towers seemed to be the answer for the conservation of the bulk of our water.

For the air conditioning installations it was necessary to have first, an ample supply of clean, cold water. We were using well water and city water for condenser cooling purposes, and this amounted to approximately one gallon of cooling water for each ton of refrigeration per minute. Our plant refrigeration capacity is 900 tons. The office and chemical laboratory is equipped with a 50-ton refrigeration unit.

The Engineering Department made several field trips to like installations to see different types of cooling towers in action and discuss their merits and shortcomings with the owners. This proved very helpful in many later problems.

Our final plans called for a cooling tower to handle 950 tons of refrigeration. The 50 additional tons above our present capacity were to cover a possible future expansion. Having decided on the size of the tower, the location of it became our prime interest.

Our refrigeration equipment consists of one, 100-ton Trane, one, 300-ton York, and one, 500-ton York unit. These three units are housed in the plant basement.

Tower Installation

From an operational viewpoint we wanted the towers placed so they would have an unobstructed path of air across them. The ideal location was on the roof of the plant on the newest plant addition.

After deciding on a location, it was necessary to call in a consulting engineering firm to check the building construction with reference to carrying the proposed cooling tower. We felt we were not qualified to pass on a structural problem of this nature. Certainly the firm who designed the original building should be better qualified than we. The consulting firm picked a location on the roof which was reinforced beneath with columns.

With this information, our engineers designed a suitable steel sub-structure to carry the cooling tower load. The roof in this section of the plant is of reinforced concrete slab, covered with tar and gravel. Holes were cut through the slab, above the column pads to pick up reinforcing rods to anchor the base pads of the cooling tower.

Our final choice was a Marley cooling tower. It is a three-cell tower, with three fans, each variable speed, directly connected to each of three 15-hp motors. The tower is of redwood construction, bronze bolts throughout, and the ends of the tower are fabricated of corrugated asbestos board. See Fig. 1.

The tower may be operated with or without the fans running. It may be operated either with two cells, or only one cell. At any time, one cell may be cleaned while the other cell remains in operation.

The bottom of the tower basin stands approximately five feet above the roof. The length of the tower is 30 ft 6 in. and the width is 22 ft 6 in. Mounted at one end of the tower is a steel ladder for getting up on top for maintenance purposes. At each end we have mounted a cluster of spotlights to illuminate the tower at night for service work.

All of the steel work was first given a coat of zinc chromate undercoat, followed by a coat of industrial aluminum paint.

Located approximately 100 ft from the base of the cooling tower is one of our elevator penthouses. This penthouse lies directly in the path of a line drawn from our cooling towers to our air conditioning units in the basement of our plant. See Fig. 2. This penthouse was extra large and had sufficient space available in it to

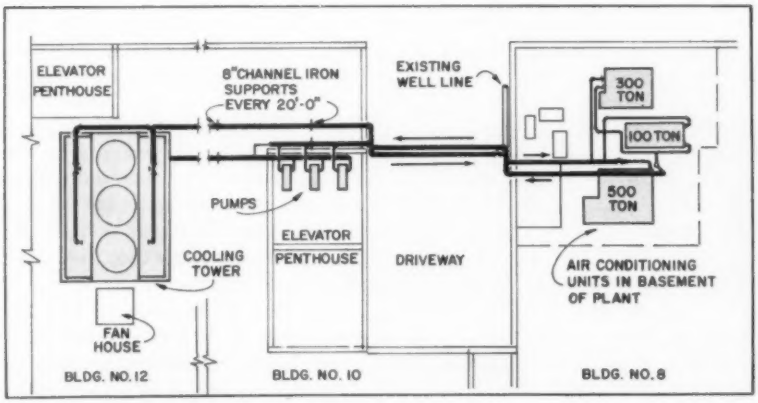


Fig. 2. Diagram shows how the piping system ties into the large cooling tower on Building No. 12 and air conditioning located in basement of Building No. 8.

Fig. 3. View of bed plate, steel roller and stiff-leg support for piping system.

Fig. 4. Because of the success on the first installation, three additional cooling towers were installed to take care of the vacuum equipment in the plant.

permit us to arrange three pumps side by side.

Each of these pumps is capable of delivering 1000 gallons of water per minute at a 70-ft head. These pumps are horizontal, end suction, centrifugal pumps, with a six inch discharge, and an eight inch suction. The motors for these pumps are 25 hp, 3 phase, 60 cycle, 220 volts, 1725 rpm, ball-bearing and weather-proof motors.

Each pump is capable of delivering cooling water for 500 tons of refrigeration: two pumps together will handle 900 tons of refrigeration with ease. The third unit becomes a standby unit and permits us to switch operations from one to another to permit "spelling-off" any one unit. This arrangement permits great flexibility of operation and provides insurance against forced shutdowns.

It may be of interest to mention that all of the material necessary for the cooling tower was placed on the roof of the plant with a portable yard crane equipped with a 100-ft boom. Sling loads of the material were hoisted to the seventh floor roof. This was accomplished from a narrow alley behind our plant. All of the other material used on the job was brought up on the roof by means of a small contractor hoist slung over the edge of the roof.

Piping Supports

The piping between the cooling tower and the refrigeration machines is 12 in., schedule 40, black iron pipe. All the piping in sizes above 3 in. is welded. This piping is supported on stiff-leg supports, the actual pipe is set on a roller to permit movement of the pipe. The stiff-leg pipe supports, Fig. 3, are welded to large steel plates to dissipate the weight over a large area.

Three pumps are connected to the main supply line from a header. From the pumps the main water line drops seven floors and across an alley-way to enter another section of the plant. Here, this line then goes down into the plant basement. The vertical run of piping is supported by a heavy steel support anchored in concrete. The main water line alongside the building is anchored by means of pipe hoops.

The cooling tower is supplied with a 2-in. city water line which is used for makeup water. This line is metered so we can keep track of the quantity of makeup water used daily. It also assists in accounting for our water for sewer tax purposes. We have found through experience that our makeup water usage averages about four per cent per month. It will vary somewhat with wind conditions and temperature. We prefer city water for our makeup because it has already been treated. Speaking of water treatment, we treat our cooling tower water all of the time. We try to maintain our pH at about 6.

We have set up a schedule of cleaning the tower once a summer. It has been our experience that in this period of time we collect a sizable quantity of dirt.

For purposes of safety we have provided a 250-ft, rubber-lined, cotton fire hose. This hose is attached to our plant sprinkler system. The hose is kept in one of our elevator penthouses, and is ready for use in case of a fire in the cooling tower. In addition, both cells in the tower are protected with sprinkler heads.

Through the use of cooling towers we have increased the efficiency of our air conditioning units. Before, sand and lime deposits made frequent acid treatment of the condenser necessary. Recent checks of the condensers showed them to be clean.

Inasmuch as the cooling tower is only needed for air conditioning, it is shut down in the winter. At this time the tower is drained, cleaned and made ready for next year's operation.

Our first cooling tower installation was so successful that we soon began making plans to change over all of our operations where water was a problem to cooling tower operation.

The next job was to convert three of our large vacuum chambers used for tobacco processing to cooling tower operation. The manufacturer of the vacuum equipment was called in to select the proper size cooling tower to handle the vacuum equipment.

This vacuum process is a 12-month operation, so it was necessary to design the equipment to operate in the winter time as well as in the summer.

Three like towers were selected to perform the task. These towers, Fig. 4, were erected on a steel grid structure above the roof of one of our single story buildings. Proper steel supporting legs were brought down through the roof of the building and these legs are anchored beneath grade to the poured footings.

Three More Towers Added

These towers are identical with our large tower. The three towers are connected on top by a continuous catwalk for maintenance purposes. A cluster of floodlights are placed at the corners for night work.

The city makeup water line is heated at the point where it enters the tower; also each float box is protected from freezing by a heated electric cable. These three towers are also protected with sprinklers.

They are designed for a water flow of 600 gpm. The water is treated every third day. A daily check is made by our own chemical laboratory. Makeup water to these towers runs approximately three per cent. This is because part of the process steam is condensed in the condenser cooling water, which helps to make up the normal windage loss.

These three towers are located in a dustier location, and are running 12 months of the year; therefore, they require cleaning more often. Shutting down these units is done over a weekend, at which time a crew is assigned to do the job.

The erection of these three towers was easier than our large tower. Being located only one and one-half stories in the air made the problem of getting the material to the site that much easier.

Our process of making cigarettes is dependent on using vacuum in part of the operation. This vacuum is furnished by three large vacuum pumps. They use water in their operation to create a vacuum. Once the water is passed through the machine it is then disposed of to the sewer. This process became a natural for cooling tower operation. A second water problem concerned the water used by the office and laboratory air conditioning units.

Again our Engineering Department undertook to solve these problems. They were lumped together and resulted in the following solution.

Of necessity our vacuum pumps must operate 12 months of the year. The office area required air conditioning only during the warm months. This problem resolved itself into two separate towers. Since these towers could be located side by side, a triangular steel frame was designed to accommodate them, Fig. 5. The steel frame for support was placed across the corner of two intersecting fire walls on the single story roof of our plant.

The smaller tower is a 30-ton unit; the second tower, 50 ton. Both towers were increased slightly in size in order to provide for future expansion.

Three pumps were installed; two pumps to handle the load, the third pump to act as an emergency standby. Each pump is capable of pumping 100 gallons of water per minute. By alternating the pumps each day, all the pumps receive about the same amount of wear.

The float-box and makeup water piping are protected from freezing by insulation and electric wire heaters. This is necessary as these units run during the winter.

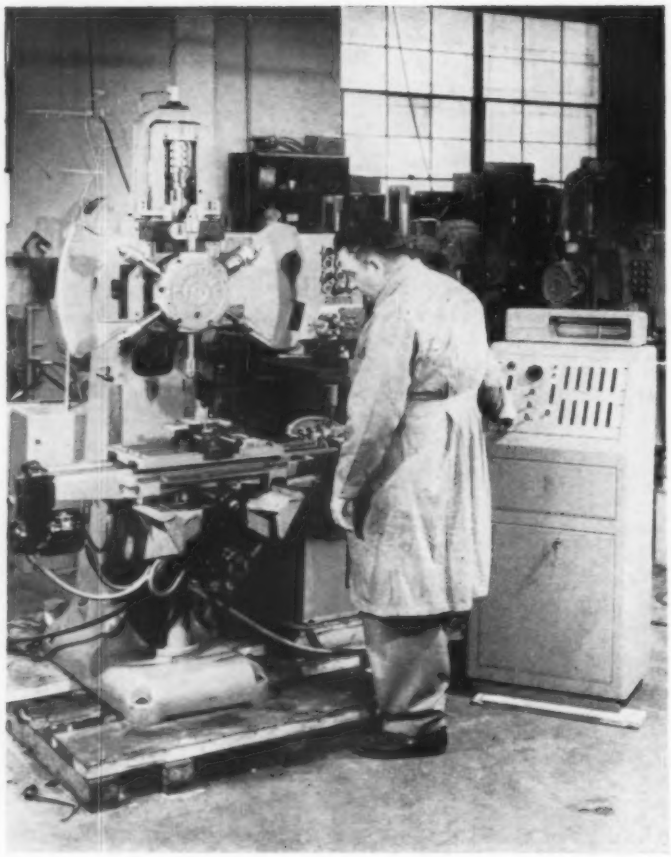
Before the installation of these towers all the water used by the refrigeration units would have been returned to the sewer. This not only wasted water, but was very expensive.

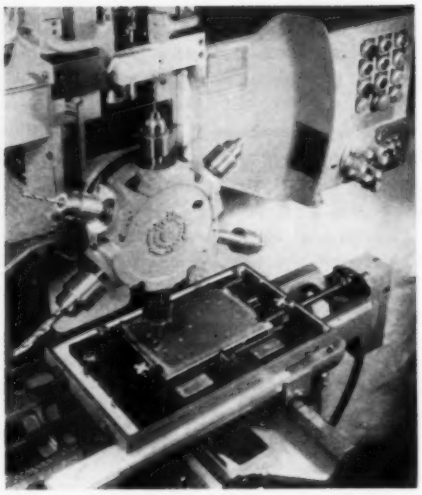
Makeup water for these two smaller towers runs approximately four per cent. Neither of these units operate with fans which helps reduce the windage loss. The makeup water line is also metered as with our other towers to give a check on our water usage.

Twice during the summer the towers are shut down, drained and cleaned. A spot check of the tower and equipment is made at that time.

We spent $88,301.96 for our complete cooling tower installation—six towers, piping, painting, etc., and they are more than worth every cent of it. **End**

Fig. 5. Two other water problems were solved by installing a 30- and a 50-ton tower. Makeup water for these smaller towers is approximately four per cent.





Turret drill and punched tape control, left, in test setup for evaluation. Closeup of turret drill head, above, shows variety of operations that can be performed at any position.

DRILLING FOR DOLLARS

Punched Tape Machine Pays Off in Eight Months

By J. W. MOFFETT, Chief Equipment Engineer, Hughes Aircraft Company, El Segundo, California

EXPERIENCE with a numerically controlled machine tool in our El Segundo plant shows a gross potential saving of $51,000 in its first year of operation.

To test numerical control in drilling, we purchased a Burgmaster 2 BHT drill equipped with Electropoint automatic positioning table and controls. The machine is a six spindle, hydraulically actuated, turret drill. The control system positions at 100 in. per min and selects any of the six spindles or a multiple in sequence per position with less than 0.001 in. error per total hole pattern. The command vehicle is a Mylar tape with a preparation time of less than one minute per element.

In a typical operational sequence, a prepared tape loop is installed in the tape command unit and advanced manually to the start position. A ready light indicates the system can accept a semi-automatic or automatic cycle.

With the system set for automatic operation, pressing the starting button advances the tape to the first position where the desired X and Y positions are read simultaneously by the machine, together with the turret sequence.

Positional data is fed to comparison units and the turret position to a turret control relay unit. The comparison units drive the positioning table in the proper direction until the desired position is reached. Automatically, table clamping is initiated and the first-drilling operation begins. Any further drilling operations at this position are performed in the sequence punched into the tape.

After the final drilling operation, the tape advances to the next position, where the cycle is repeated. Alternatively, a stop command, punched as part of a sequence command, will hold the system at the existing position.

When the semi-automatic switch is used, the tape advance button must be depressed to advance the

tape to the next command and the sequence advance button depressed for spindle advance. The semi-automatic switch is useful in checking individual operations, while still maintaining the advantage of a taped program.

Proper tape preparation, of course, is essential to the success of the operation. Decimal information from a blueprint or a table of dimensions is perforated in the tape in two rows, one section for the X position and one section for the Y position. A third section is used to designate one through six spindle sequences per position and a stop command if desired.

Up to six spindle positions can be programmed at one X and Y position without requiring tape advance, therefore decreasing preparation time and tape length. Each of the X and Y rows has five separate decade groupings so that each number of the five-decimal-place dimension has its own location. Coding or conversion tables are not needed.

Tape punching, in the standard unit, is accomplished by a hand punch inserted into the decimally numbered holes. An accessory which will further decrease time of tape preparation provides a manual keyboard, similar to that of a calculating machine, which punches the tape automatically when a particular set of keys are depressed.

Positive measurement of machine position assures accurate control without accumulative errors. Once the table is fastened to the machine, there is no need to check the reference again.

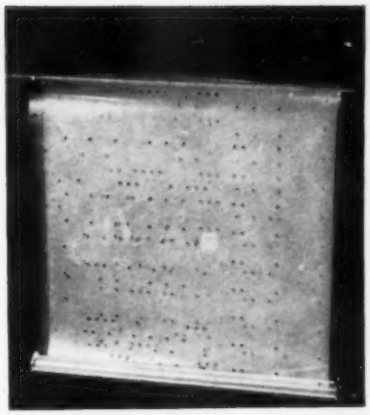
Display of machine position is in direct-reading decimal form to 0.001 in. This is, in essence, an electronic micrometer which permits manual setting of the machine. The table is moved either by the motor control switch on the console or the hand wheel on the table. The drill spindle is advanced by the sequence advance push button. Direct readout of X and Y position and the active spindle is displayed at all times.

Information for preparation of a tape from a prototype part is also made possible by the display. The table is moved manually until the correct spindle is located in the appropriate hole of the part. In this position, X and Y and spindle information is recorded by the operator.

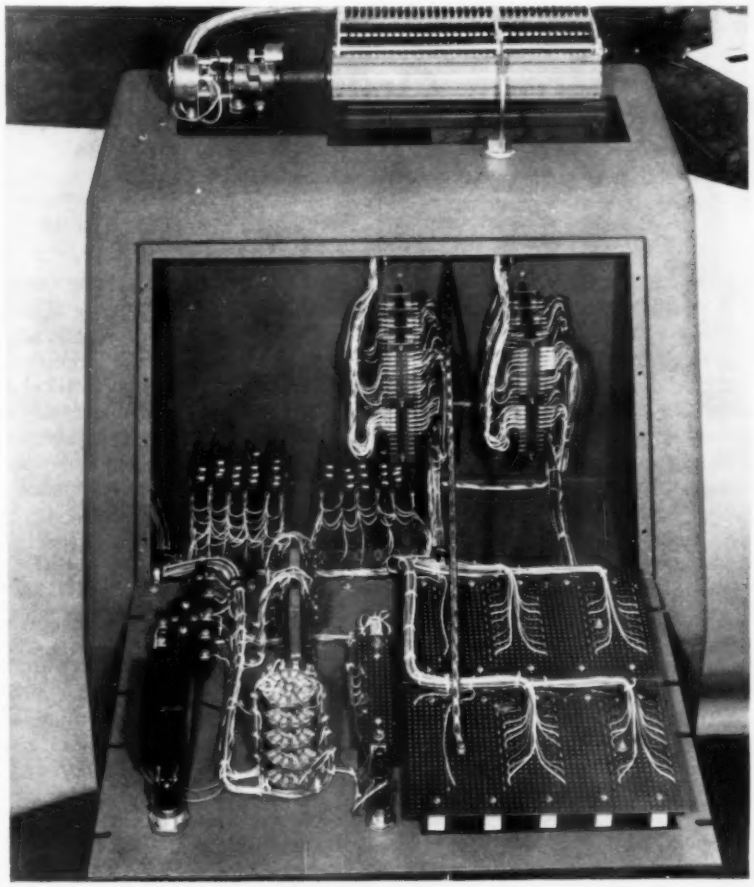
Manual control operations can be accurately interspersed with the tape program. The tape and the control system can be checked rapidly utilizing the display readout, both before the first part is machined and during the operating cycle.

Positioning of the table in each axis is accomplished with a servomotor whose speed is controlled by the positional error at each particular instant. This produces the fastest response with minimum mechanical wear. Flexibility is designed into the system for future additions such as drill depth control. This will permit the same drill size to be used to produce holes of varying depths.

Redesign of details ordinarily requiring extensive tool rework can be handled quickly by the machine. Our complex jigs also contribute to lost time in drilling. Our most extreme case involves a job with 166 parts. A comparative run on this lot produced 118 on the Burgmaster, 48 by jig. **End**



Signals to position and sequence control are punched into Mylar tape.



Open Electropoint console shows tape reader and transport mechanism, top, and components mounted on the control panel arranged for easy maintenance.

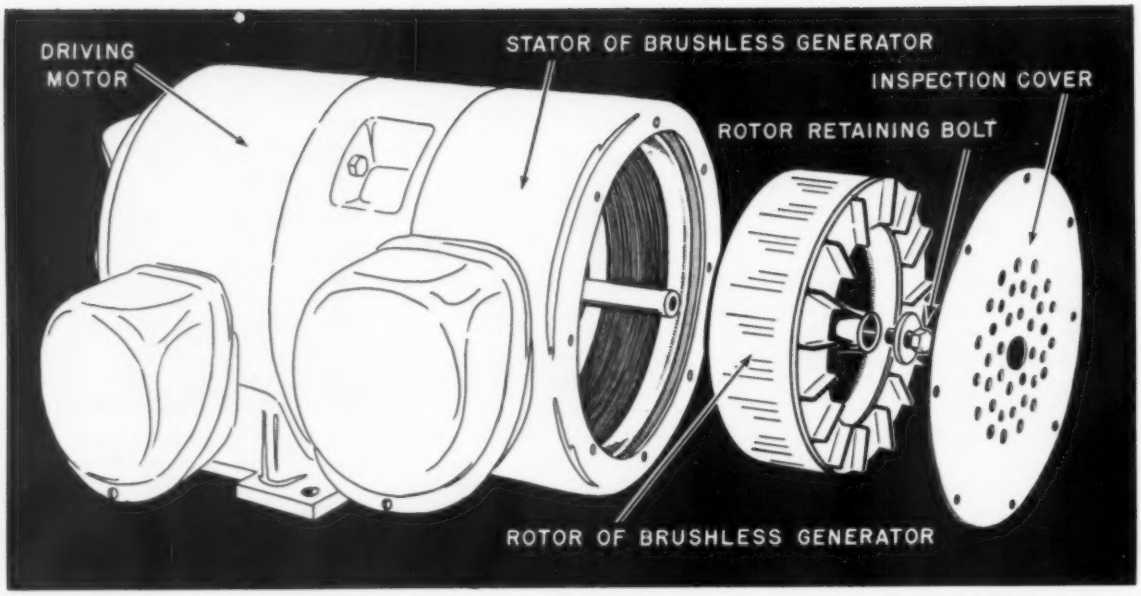


Fig. 1. Simple construction of generator on frequency converter reduces maintenance required for dependable operation.

HIGH FREQUENCY LIGHTING
With Only One Moving Part

By SHELLEY KRASNOW, Georator Corporation, Manassas, Virginia

ADVANTAGES and economies possible with high frequency lighting systems appear so compelling that further activity in this field is to be expected. It is not at all surprising, with the success attained on installations already made, that a number of new installations are now in the planning stage.

General features of these systems have already been detailed in a previous article*. No attempt will be made to repeat this material. The function of this article is to describe a type of frequency converter, used to obtain power for high frequency lighting systems.

Rotating types of frequency converters have a long and dependable history of performance behind them, having been used for more than 75 years in the electrical industry. However, there is still opposition, in some quarters, to anything that moves or rotates. In the case of the usual type of motor-generator set, the brushes, exciter and regulator are considered the most likely sources of trouble or maintenance difficulties. Most of the resistance to the motor-generator appears to stem from the troubles believed inherent in these last-named elements.

Such prejudice does not seem to hold for the three-phase, squirrel-cage induction motor. Individual manufacturing plants may have hundreds, or thousands of these units in operation at any given time and little trouble is experienced with them. Most opponents of rotating machinery would quickly drop their opposition, if such machinery had the simplicity and ruggedness of the three-phase induction motor.

General appearance of the converter is shown in Fig. 1. The construction involves a three-phase squirrel-cage motor with a flanged end-bell similar to that employed in mounting close-coupled centrifugal pumps. The generator rotor, which has the shape of a narrow flywheel, is mounted directly on the motor shaft, much as a pulley would be. In addition to its other properties, the generator rotor behaves like a flywheel, a feature of importance for stable operation.

The rotor is a permanent magnet type, without any windings. Absence of windings makes it unnecessary to conduct current to or from the rotor. This explains the total absence of brushes, slip rings, and commutator in the unit and is one of the principal reasons for its simple and trouble-free character. The rotor has the same general construction as the rotor of a three-phase, squirrel-cage induction motor.

Since the rotor is virtually the heart of the machine, it will be described briefly. It consists of a steel central wheel, provided with a hub

*See "What's New in 400 Cycle Lighting," Sept., 1957, Page 124

which is bored and keyseated to fit the motor shaft.

Mounted radially on this rotor, like the spokes of a wheel, are the permanent magnets. Each of these is provided with a steel cap and the entire assemblage cast in aluminum. The steel and aluminum combination is then machined to size and magnetized.

Excitation is thus provided by permanent magnets and need not be furnished by exciters or other means. In a sense, the excitation is purchased when the machine is bought. It is literally permanent. The magnets will not need recharging, even after years of service.

The stator, with its housing, bolts directly onto the flange of the motor. This component has all of the stationary windings in the generator portion of the machine. The length of the stator along the motor axis is little greater than the normal shaft extension of the motor. The entire combination therefore, fits into a space not much larger than that required for the motor alone.

Motors are usually 60 cycle, 3-phase, 3600 rpm, squirrel-cage types. Where 60 cycle power is not available, 50 or 25 cycles can be used. In some cases, single-phase only may be available. In such cases, single-phase motors can be used for drive with the minor added complexity of motor-starting devices which are not required for three-phase types. Two-phase power can be utilized, exactly like three-phase.

These features allow utilization of virtually any type of electrical energy as input; a factor of importance in many installations where provision of a different frequency or number of phases would be costly.

Construction of the unit, with its flywheel type of rotor makes it possible to obtain high quality illumination with a low quality primary power supply. Often, the available power is subject to large voltage fluctuations, some of which may be due to starting large motors.

Such changes will ordinarily cause extreme flickering of lights which must operate from the same line. Running separate lines for illumination, or using larger feeders to limit voltage drop, may both be rather expensive expedients.

With the use of a motor-generator type of converter, input voltage changes are usually undetectable in the lights themselves. Voltage changes, even those of long duration, affect output only by affecting speed. The driving motor speed is highly insensitive to voltage. Thus, input voltage fluctuation is not noted in the output.

Fig. 2. Only moving part in converter is this husky permanent magnet rotor.

Output of the generator portion of the unit is usually wound to deliver directly the voltage required to start the lamps. This higher voltage reduces wiring costs, since the same amount of electrical energy can be transmitted with smaller currents. This means smaller wire size and smaller conduit. Starters of any type are unnecessary and maintenance associated with starters is thus eliminated. For 48-in. slimline lamps, 400 volts are normally utilized, while for 96-in. slimline lamps, 600 volts are provided.

In order to obtain maximum output from a given machine frame, the generator portion is wound three-phase. However, the individual phases are not interconnected as in a usual three-phase machine, but are used as three separate, single-phase outputs. Each of these phases is center-tapped within the generator winding and each center-tap is connected to ground at the generator. The purpose of this is to leave no point of the entire output system more than 300 volts above ground. This conforms to Underwriter's requirements.

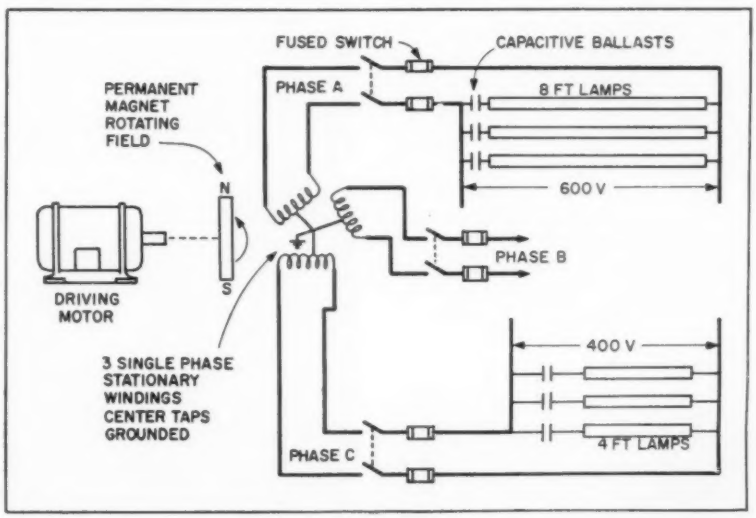
Since the three output phases are separate, it is possible to wind one or more for a lower voltage. This would be done where it was desired to operate 48-in. and 96-in. lamps from the same machine.

Frequency utilized in the machine output is 840 cycles. A word is necessary on the reasons for this choice. Most of the early work with high frequency illumination was done with 360 and 400 cycle frequencies. This was dictated by practical rather than theoretical considerations; the ready availability of converting equipment for these frequencies.

It was realized, nevertheless, that performance improved as frequency was raised; this rule holding for increases up to at least 20,000 cycles. Why not then go to such frequencies? The answer is that transmission and conversion difficulties intervene, as one increases frequency. As in most engineering problems, a compromise between cost and performance is necessary.

With the type of rotating machine

Fig. 3. Three single-phase windings permit operation at different voltages.



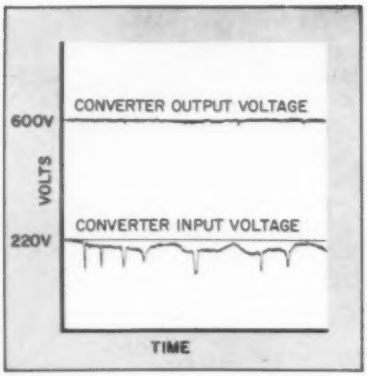


Fig. 4. As speed of driving induction motor is dependent upon line frequency, voltage variations of input power have little effect on output voltage.

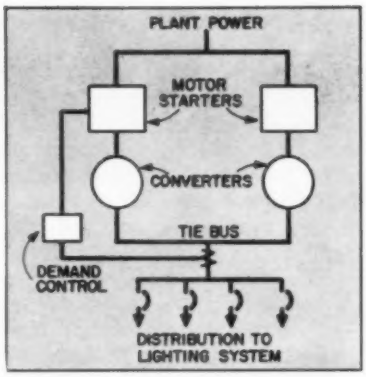


Fig. 5. Parallel operation of converters requires no special synchronization and can be made responsive to demand control to match the needs of the system.

described, 840 cycles was as readily attainable as 400, could be produced economically and involved only a minor increase in transmission loss. Aside from improvement in performance, some further saving was attained in the size of lamp ballasts and correcting chokes. Detailed cost analyses show that first and operating costs are lower at 840 than 400 cycles.

One conspicuous manner in which this converter differs from other types is in the wave-form of its output. Ideal high frequency fluorescent lamp performance requires a square wave of current through the lamp. This requires a specific wave form from the generator such that, when impressed upon the lamp and ballast, will yield a square wave of current. What form the voltage wave will take, depends on the ballasting.

It is thus necessary for the converter manufacturer to maintain close liaison with the designer of the over-all system and provide an output wave form for optimum effectiveness. This tailoring of the unit to its load has proved well worth the extra effort required.

Load power factor, with capacitor ballasting, is highly leading. Correction is usually effected to a net power factor of about 0.85 leading. At this power factor, with the converter described, the output voltage will not vary more than about one or two per cent, regardless of load and despite large input voltage changes. The separate phases can be loaded unequally, without impairing this operation.

For total lighting loads above 30 kw it has been found advisable to utilize several small units for conversion, rather than one large one. All units are capable of being switched onto a common bus and are connected or disconnected, depending on the demand of the lighting system. Automatic switching equipment is available to detect condition of load and switch in or disconnect machines accordingly.

Generators can be thrown onto the bus without careful synchronization. It is only necessary to start the motor driving the incoming machine, wait till it comes up to approximate speed and throw the machine on the line. It is not necessary to adjust voltage or phase, nor to equalize sharing of load after connection. All this is done automatically, due to the internal construction of the machine.

Efficiency of the converter is favorable as compared with other types. Due to the absence of external excitation, the usual excitation losses are absent. Measured temperature rise on a typical converter was 22 C. Since inefficiency manifests itself as heat, the limited temperature rise is an excellent indication that high efficiency has been attained in the converter.

Another feature of interest is the complete immunity of the generator unit to short circuit. In the event of an inadvertent short, the generated current automatically drops to so small a value, that insufficient heat is generated to damage the machine. This action is virtually instantaneous and faster than an external protective device. It therefore becomes unnecessary to protect the machine, although protection may be desirable for the line and other circuit components. **End**

Fig. 6. Installation made with standard components, requires no new techniques.

Part II

Preventive Maintenance—Alaska Style

USAF System Works Well for Large Bases, Small Sites

This is the second of two articles on how the Alaskan Air Command, USAF, tackles the job of preventive maintenance. It's the men who make the job a successful undertaking in this Command, but they are backed up by an efficient and simple preventive maintenance system

By M. E. WEISSMAN, Associate Editor, Plant Engineering

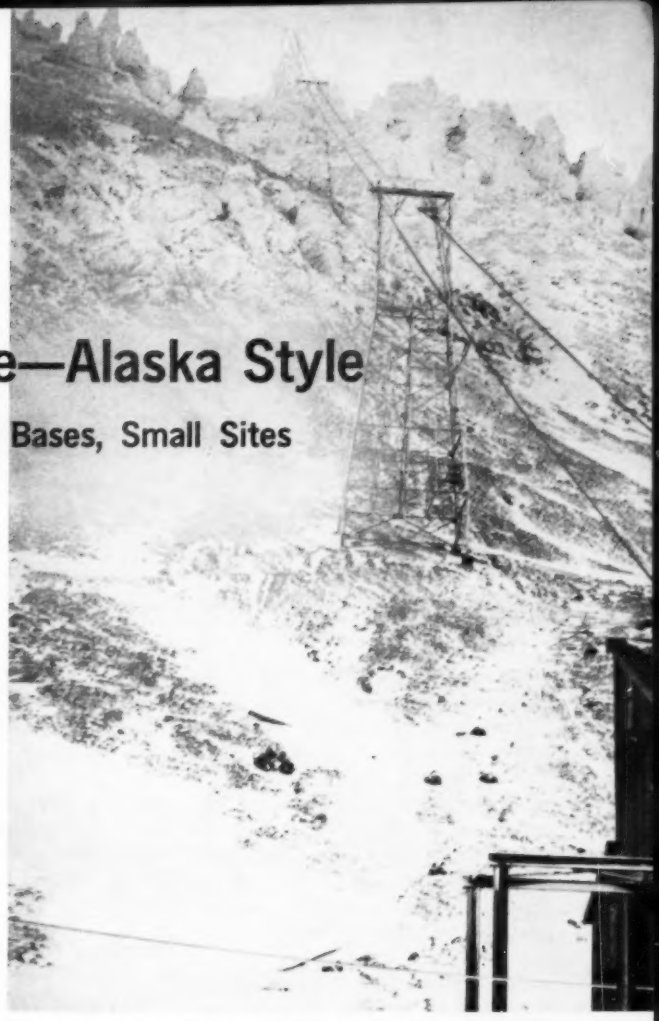


Fig. 1. Aerial tramways must be thoroughly inspected daily.

IN MUCH OF THE new state of Alaska, shallow wells provide an abundant water supply but in the north and northwest particularly, water supply is problematic. Not that there is any lack of water—swamps, lakes and rivers abound—but during the winter months these sources are frozen.

Drilling a well through the permafrost—permanently frozen ground or rock lying beneath a thin stratum of earth which freezes and thaws with the season—presents numerous difficulties. For one thing, it varies from just a few feet in thickness on the southern fringes of the permafrost belt to 1300 ft at Point Barrow, northernmost tip of Alaska. Where a deep well is drilled through the permafrost, a lead-covered heating unit must usually be hung in the well to prevent freezing.

Somewhat simpler is the method used at many of the northern sites—impounding dams which store a winter water supply during the short summer. When this supply is adequate to last through the winter, heated, insulated lines carry the water from the pond to the installation. But, where the unfrozen supply is inadequate to last through the season, the water is piped to heated storage tanks. Sometimes the tanks alone are heated, sometimes they are protected by an insulated wood building as at Cape Lisburne.

One difficulty has arisen: heat from the water radiated to, and thawed, the permafrost on which the tanks are built. Over a period of time, this has caused the tanks and building to settle and fail. Considerable shoring with steel supports has been necessary, but still the tanks continue to lean further and further out of true, see Fig. 5. Final solution will probably be to relocate them on deep-set piling.

Impounding water is the relatively simple way of getting a water supply but where such a supply is inadequate, snow must be used. Large quantities of snow are melted in a steel tank in the ground, the open top set flush with the ground level, Fig 2.

Steam-heated radiators melt the snow as it is pushed into the melter by a bulldozer. The water is piped from the bottom of the melter to the storage tanks.

At certain ACW stations and "White Alice" radio communications sites, even pipelines are impractical for water supply. Then, it must be transported by tractor, weasel or sled, along mountain "roads" or, when these methods are impractical, by aerial tramway.

Since supply to these sites is critical, make-shift snow melters, consisting of 50-gal drums heated by batteries of lamps are used to supplement the regular water supply. As water is used, enough

Fig. 2. One of the means of providing water at remote sites is by a snow melter.

snow to provide an equivalent amount of water is replaced.

The lack of readily available water during winter months makes fire the greatest hazard at all installations. Firefighting becomes an all or nothing proposition. More than a small blaze and the building is "lost" until warm weather. Reason: water used in firefighting turns to ice as it hits the building, putting it into a state of deep freeze from which it cannot be thawed until nature lends a hand.

The standard fire trucks will freeze when used in low temperatures, making it impossible to operate the equipment for effective firefighting. Because of this, trucks are specially designed for the Arctic, all pumps, tanks and water lines being enclosed in a large heated van-type body and all valves and pumps pre-set in the "action" position.

Fire Hazard Stressed

At Cape Lisburne, well north of the Arctic Circle, Lt. Charles Burgess, the Installations Officer, will tell you that the problematic water supply, high winds and extremely low humidity which makes the wood buildings like tinder, combine to make fire the biggest potential hazard at his site. A constant and lively campaign, with posters on every door reminding one of the dangers of fire, and frequent fire drills are used to make everyone conscious of this danger. Foam extinguishers are close at hand throughout the buildings and a fire truck equipped to use both foam and water is kept in readiness. Buildings interconnected by covered walkways are isolated by fire doors, section by section.

Working North of the Circle

Let's take a look around this northern site. The Air Force installation here lies entirely isolated on a narrow strip of ground between the Arctic Ocean and the barren, snow-blown, caribou country of the Delong Mountain range. To the inexperienced eye it looks as though we could almost graze our fingertips along the mountainside as we fly into the Lisburne landing strip—part of which doubles as the beach and which is constantly eroded by the ocean.

High winds often make landing a difficult, and sometimes impossible, operation. Many planes, after having flown several hundred miles, upon arriving at the remote station must return to their home base without delivering their cargo.

Cape Lisburne is one of the oldest of the radar sites, built approximately seven years ago. Many of the methods of planning and construction have been improved since then—for instance, lift slab construction has replaced wood, ceramic tile walls have superseded painted wood — making the job of maintenance a great deal easier and simpler at the newer sites.

Here, even in moderately good weather, it can be a rugged hand-over-hand fight to hang on to the 1000-ft "life-line" cable stretched between the ACW station and White Alice building atop the mountain. Throughout most of the year these mountain-top installations are inaccessible from the base camp even by "cat" or "weasel," so here, as at six other similar installations, an aerial tramway is used to transport men and supplies between them and the base camp below.

The tramway car makes at least three trips daily on schedule. It's a two-man job to operate these cars and a tricky one too, especially with a 50-knot wind blowing. The operators, one in the car and one at the controls in the operating station, work together by radio, easing the car through each tower—some of which exceed 100 ft in height—and into the dock.

As the tramcar lurches into the dock, perhaps caught by a gust of wind, passengers bend their knees slightly to avoid being thrown against the steel walls. Getting out, we grasp the nearest handhold, convinced that if we don't, we'll be blown away for good.

Daily Inspection

Maintenance on these tramways is a thankless task. It must be thorough and strict and is at best a difficult job. Every foot of the 2700-ft cable on the Cape Lisburne tramway, the saddles over which the cable and car pass and the operating machinery must be inspected daily.

What happens in bad weather, when temperatures are —50 F and high winds prevail? "We inspect 'em just the same—tomorrow the weather may be much worse" is the comment of the man whose job it is to see that the tramway equipment is in perfect order. A safety belt can be used only while clambering from the car on to the tower; after that he is on his own.

One of the problems in keeping the tramway operating is the elimination of ice build-up on the track and traction cables, see Fig. 6. Two methods are used to combat these accumulations. The first is the periodic operation of "ice runs" of the tramway car to break the ice off. The second is to apply anti-freeze — concentrated ethylene glycol — to the cable which reduces the ice formation.

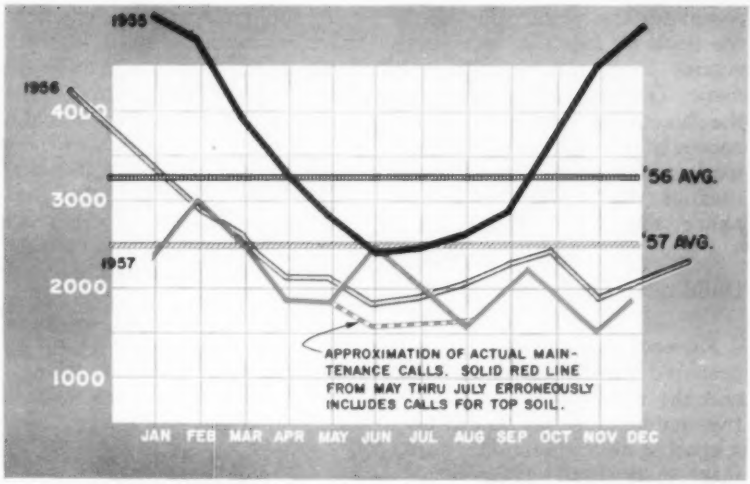


Fig. 3. Graph shows calls for maintenance between 1955 and 1957. Line for 1955 shows number of calls before present preventive maintenance system was in use.

Maintenance versus Weather

Maintenance at this site is a continual fight against the weather. The wood construction of the buildings is affected by frosting conditions, see Fig. 4; snow somehow manages to blow into buildings even through double doorways; buildings sag because they are built on permafrost. Snow drifting too, becomes a real problem especially here where there is no tree coverage to help prevent it. Snow is blown against outward opening doors, making the snow removal job an urgent one.

In spite of all these difficulties, a look around this almost immaculate installation would make some Stateside plants more than a trifle envious of the job being done there. Garage, carpenter shop, plumbing shop—all are neat, clean, businesslike. After probing, poking, and inspecting thoroughly, the maintenance inspection team comments, "Nothing to complain about—no matter how hard we try."

In recognition of this fine job, Cape Lisburne has received the Preventive Maintenance Trophy for 1957 awarded by the AAC for the best maintained site.

Four-Form System

Finally, let's take a look at the Air Force system used by Alaskan Air Command maintenance personnel to do their jobs. The maintenance system is based on four forms—a big improvement over the 38 that used to be required.

The forms used are: 1. Preventive Maintenance Checklist; 2. Preventive Maintenance Service Record; 3. Preventive Maintenance Control Card; and 4. Preventive Maintenance Job Request —Real Property Facilities.

These records are kept in looseleaf books which are classified according to the craft using them, the zone and area in which they are being used—the bases are zoned for convenience in administration—and the number of the individual book. These books are kept in a central library and are issued by the zone foreman to the senior preventive maintenance worker, who in turn assigns the book to each craft worker. As he

Fig. 4. Plywood siding in covered walkway has cracked and is separating due to the severe frost conditions.

Fig. 5. This is not an optical illusion. Water tanks in insulated building sag because radiated heat melts permafrost.

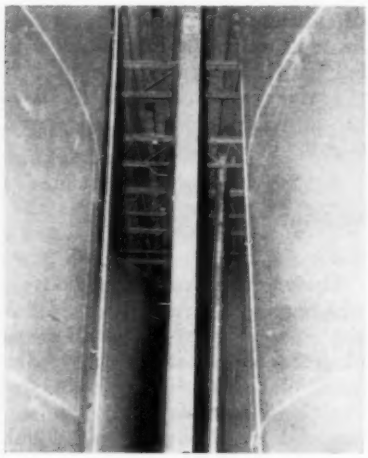


Fig. 6. Ice formation on a tram car housing. "Ice runs" and anti-freeze applied to the cable reduce accumulation.

completes the work called for in the book he logs the appropriate entries in it and signs his last name. The zone foreman monitors the book and determines the necessity for job requests—that work which exceeds the capabilities of the preventive maintenance team.

Buildings, Equipment Listed

For each base, a chart has been prepared which lists all buildings and the dates on which preventive maintenance teams will be in a specific area. Individual equipment in the building is listed in the appropriate PM book. The dates on the chart are adjusted upon completion of a team cycle.

Duplicate copy of the chart is used by the Repair Order section so that the date on which a preventive maintenance team will be in a specific area can be passed along to anyone telephoning in a request for repair work.

During the next scheduled visit, the team will make the repair, along with routine maintenance.

A chart hanging on the wall of the Alaskan Air Command PM chief's office shows how this system has reduced the number of maintenance calls, see Fig. 3.

Occasionally an emergency repair will be necessary. If it will take about half hour, or less to complete, a radio call will go out to a maintenance truck. Otherwise, the call will be sent to one of the eight well-equipped craft shops where major work is accomplished. Two trucks are radio equipped to handle these service calls. Other trucks used by the steam and electrical distribution crafts are also provided with two-way radios so that work at distant points on a distribution line can be easily coordinated.

In certain cases, mobile teams of highly skilled workers and specialists are assigned permanently to a particular zone. They have proved efficient and economical because they work out of the maintenance trailers instead of reporting to the central maintenance division office. On a base as spread out as Elmendorf, this arrangement saves many man-hours a day.

A similar plan is in effect on a command-wide basis — mobile teams are always ready to fly, by "gooney bird" (DC-3) or helicopter or take a truck, weasel or dog sled, if need be, to the remote sites to accomplish those jobs that cannot be handled by the site installations engineer. Their work ranges from minor pump repairs to the construction of an entire system.

If necessary, an ailing diesel generator will be picked up by plane, flown to a main base diesel maintenance shop, where it will be repaired, or even rebuilt. Meantime, if the repair is a major one, a replacement diesel will be flown into the site. Sometimes, difficult weather will hold up a job for days or even weeks, but the stations are so designed that emergency equipment is available to take over. Again, this is a more economical method than providing specialists in many fields at each of the sites and accomplishes the work more efficiently, since the teams can move around where and when required.

Maintenance Trailers

The mobile maintenance shops which have proved so successful are ¾-ton cargo trailers, shop-modified to suit the needs of the individual craft using them, see Fig. 7. The trailer base is enlarged by welding an additional 18-in. steel frame around it. The wood enclosure, also shop made, is insulated with fiber glass.

Each trailer is heated and fitted to serve a particular craft. The glazier's trailer, for instance, has a drop-leaf bench and special racks for carrying sheet glass; the carpenters' and painters' trailer is fitted with wall tool chests and rows of pigeon holes to store small items. All carry a 21-day supply of parts and material for the craft it serves.

Supply is one of the ever-present problems in this command, although the situation is improving steadily. It is aggravated by the fact that most everything must be flown or shipped from the States.

Fig. 7. Heated trailers solved problem of "straight-jacketed" maintenance men.

To sum up the job that the Maintenance Directorate and personnel of the Alaskan Air Command are doing, we could not do better than quote Major General A. M. Minton, USAF Director of Installations, when he presented the Preventive Maintenance Award for 1957 for the "best command worldwide" to the Alaskan Air Command: "The excellent record made by Alaskan Air Command reflects the enthusiastic cooperation of all concerned. Your efforts in this connection will remain a challenge to those commands not having extreme weather conditions to contend with and a multitude of complex utility systems to maintain." **End**

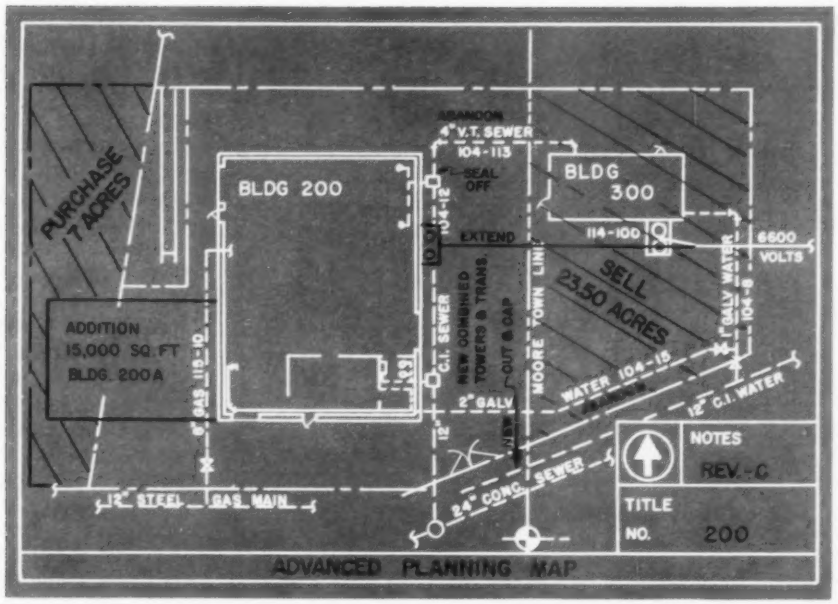


Fig. 1. After adopting advanced planning program illustrated above, the modification project can get bogged down unless the plant engineer follows a certain set of rules.

PLANT ENGINEERING FOLLOW-THROUGH
How To Minimize Delays in Plant Projects

By F. JOHN EGGERT, Mechanical Engineer, Hamburg, N. Y.

ROUTINE OPERATION of a plant engineering department is seldom flexible enough to be applied to major plant modifications. This is evident when the department starts to come apart at the seams on such a project.

To establish a point of beginning, let us assume that the proposal of a building expansion program outlined on the Advanced Planning Map, Fig. 1, has been adopted and carried through. As plant engineer you have extended the required map series* to include the new building site prior to transfer of title. The proposed land purchase proved acceptable when examined by the plant maps in the company's files.

Grouping Plant Engineering Forces—Assume that the available manpower consists of the regular plant engineering personnel augmented by a collection of personnel transferred from other departments for the project.

After a group has been assigned to handle routine plant engineering functions you can then begin assigning the manpower for the plant modification program.

It is a good policy to develop an organizational chart of the project's personnel. This is not simple. Rather it is a series of formations depending upon the current work-load. This chart definitely establishes the chain of command and should also outline the assignments.

Of course the organization must be flexible enough to compensate for the changing work-load as the modification of the plant progresses. To illustrate this change, we need merely consider the fact that many layout draftsmen and construction cost estimators are needed at the outset. Later, however, the demand is for billers of material and specification writers for sub-contractors.

Assignments—Everyone realizes that it is impossible for one man to handle every detail of a project. Accordingly, authority, along with responsibility, must be delegated for each specific phase of the work. The trick is to break down each phase to a degree of simplification so that everyone can accomplish his variety of assignments with a feeling of assurance.

This procedure also eliminates buck-passing by pinpointing responsibility. Further, it facilitates cooperation when specific assignments of each become known to all the project personnel. In fact,

*See article "Industrial Plant Map Book" in the June, 1958, issue, page 90.

Re-publication rights reserved by the author.

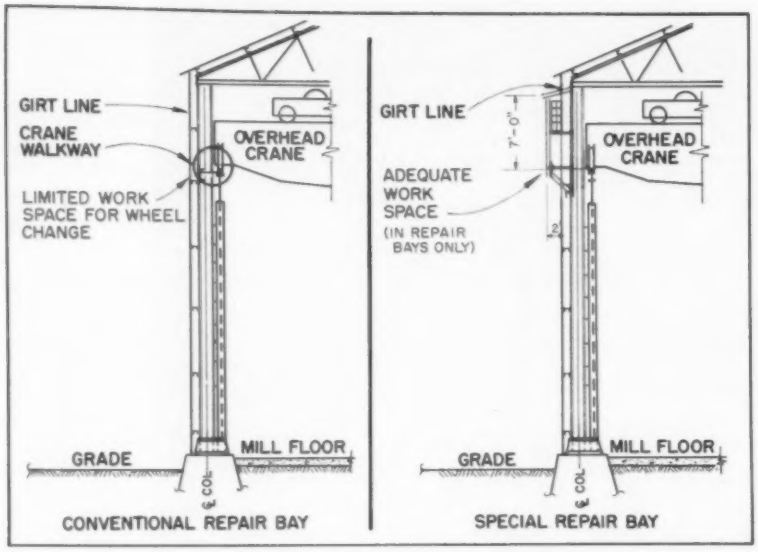


Fig. 2. Consider any and all built-in maintenance ideas which can be incorporated into the present project. An example is the special repair bay shown above.

many of the classic dilemmas such as shortages of available materials are often worked out practically unnoticed. And this without a lot of paperwork sprouting up all over the place.

In short, definite assignments keep everyone on the ball. Very few plants can afford the alternate system of all chiefs and no Indians —and all indefinitely assigned.

Instructions—Instructions for the preparation of layouts and drawings are given easily, but may be difficult to follow due to the varying construction situations to which they are applied.

At the preliminary meeting of project personnel, it is well to include a short seminar on how to give such instructions. An outline of instruction requirements would be as follows:

Explain the reason a job is being done to provide background.

Furnish ALL the data needed to save the other's time determining it.

Be specific and concise to eliminate shaded meanings and subsequent guessing.

Sketch it—don't talk it.

Agree that instructions set decision limits.

Agree that related minor decisions, not covered, are at the discretion of the persons instructed.

Include a time estimate for completion.

Include a route for the completed work.

Avoid further instructions when assignment is half completed. (establish "check-with-me" points on a complicated layout).

Understand that work revisions are an indication of poor instructions.

Reports—The conventional objections to reports can be largely eliminated if an example of both a verbal and a written report is furnished as a standard. Both types should be along the basic lines of: a. Statement of trouble or situation; b. Cause of trouble or situation; c. Possible solutions; d. Suggested most practical solution; e. Personnel aware of situation; and f. Decision and action taken.

Reports can be removed from the classification of a necessary evil if their usefulness as a tool is explained. To get your money's worth from reports channel them along a definite route. As a tool they should be used to:

Fix progress that might be otherwise unnoticed.

Revise scheduling as shown on the construction schedule chart.

To clean up assignments without any loose ends and establish the completed status.

Simplify percentages of construction phase completion.

Provide basis of consolidated weekly progress reports in addition to furnishing up-to-the-min-

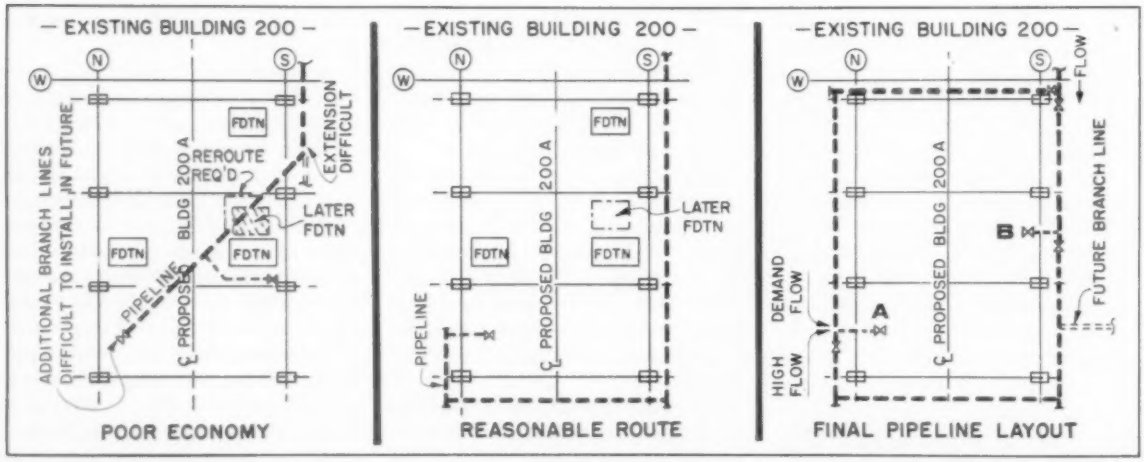


Fig. 3. Another example of built-in maintenance is this pipeline layout. Pinching pennies can prove to be poor economy.

ute standings on all the projects. As the key tool in controlling construction costs within the allocated amounts.

The simple system of assigning route numbers for channeling reports eliminates their being rehandled needlessly and assures their processing. In this way a report is a useful tool, not a historical document that is just filed away.

Liaison Between Departments—It is surprising how often the paper can be taken out of paperwork. By physically relocating the personnel concerned so that they are within talking distance of each other is a practical solution. In addition, such an arrangement will save time.

However, tradition often causes such expedients to be overlooked. It is suggested that the flow of construction paperwork be prepared with the same governing principles as a shop product flow chart. Then start moving the furniture around.

Another well-known disadvantage of fixed location of personnel is that job assignments disappear into the realm of mystery. All the functions of that particular assignment are known only to the fellow who has worked that particular job for years.

Private understandings and working agreements with other departments are of this type of classified information. Obviously, stand-by personnel for that job assignment do not exist. This sets the stage for development of a first class bottleneck on the assignment when the work load is increased beyond normal by a major plant modification. The solution here is to rotate through related assignments.

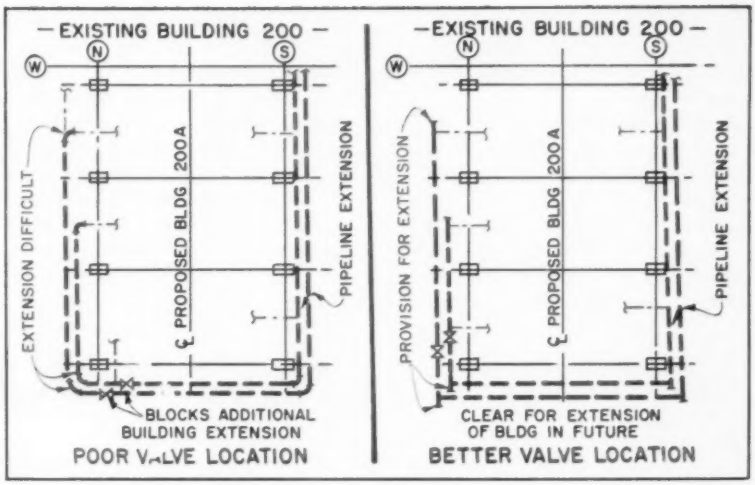


Fig. 4. Consider future expansion in the layout of all valves in new building.

Trouble Routes—Any project should have definitely established trouble routes planned for each job assignment. They are what your project needs when "somebody goofed." Make it easy for the information to get to the person with the authority to correct a situation.

Naturally the route should not involve the entire chain of command. As a result, the workload on the persons in authority is reduced and they are available to run the project rather than the details of the project running them.

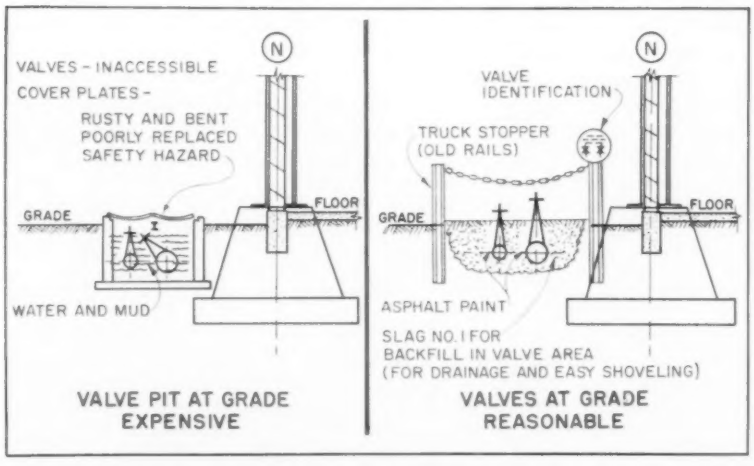


Fig. 5. Arrangement of valves can be a headache if not planned properly.

We have all been employed on projects where this feature was unknown. Minor difficulties mushroomed the paperwork and by the time any action was taken, the field crew had long since solved the difficulty as best they could to avoid delaying a construction phase. It is not fiction that some special bolts arrived two weeks after a component had been completed and installed.

Hold Orders—Without a doubt, no project was ever completed with all LET'S GO orders and no WHOA orders. Needless to say, the delegation of authority for the issuance of a hold order requires discretion. Especially so when the costs are running a modest bundle a minute. Not only do hold orders foul up the construction phase to which it is applied, say steel erection, but they also demand rescheduling of subsequent operations and, as a result, cause unnecessary delays.

The purpose of a hold order is to prevent damage or re-work and the doctrine is to be neither too late nor too early. Being too late is easy. The difficulty is apparent to everyone then. Just notice that the conduits are not installed before the concrete is poured.

Among others, the project safety man should be authorized to issue hold orders. The issuance of a hold order should not be a hit or miss arrangement, but should be specifically outlined to the group. Include the requirement that any hold order demands that the proj-

ect chief be notified immediately. Otherwise the construction operations will telescope into the stalled one.

Routine Meetings—Believe it or not, scheduled routine meetings once a week are worth the time, provided the meetings are of the round-table type. A second requirement is that everyone, in turn, is asked to air their annoyances at each meeting. Its value is in providing remedies for the small difficulties that are too petty for formal consideration.

The idea here is that unattended minor annoyances build up into major difficulties. For example: delay in obtaining crane service or one construction phase needs an unofficial priority rating over the others for a short while. The project chief can easily remedy such situations with a few phone calls and in return gains the conscientious cooperation of the entire plant engineering department.

In addition, these meetings are a useful tool in breaking bottlenecks. The procedure here is to apply the weight of the big brass to obtain real cooperation from another department or contractor.

Maintenance Design—Timing is important in requesting capital expenditures and the time to acquire the long-hoped for maintenance feature is when money is available for the construction of a new building. To utilize the opportunity, include the maintenance features in the original building layouts.

The idea here is that since the construction cost estimate is prepared from the preliminary layouts, the maintenance feature will be included. When the time comes to prove the worth of the maintenance feature, it is well to have ample proof on tap that they will pay off in maintenance cost reduction. Some companies use a special proof form for this purpose and the signatures recommending the expenditure is the real "Who's Who" of the company.

Seeing what the boys in the backroom have to say about the project has merit. Polishing up every one of their ideas will classify some of them as impractical, but it will certainly point out a number of maintenance trouble spots which would otherwise continue unnoticed. As plant engineer, every maintenance man's suggestion should be: encouraged, well-received, investigated thoroughly (photos are useful), replied to in person, and recorded for future cost studies.

It is often the case that old ideas for maintenance facilities are not reviewed since they may not have been practical at that time. But the occasion of the new building should require a present-day evaluation of all the ideas lest one that is a dandy be overlooked. It is recommended that a file be kept on every suggestion for improving the plant's maintenance.

Some of the ideas of the maintenance group will alter the building's silhouette as shown in Fig. 2. Others can be classified as built-in maintenance insurance as illustrated in Fig. 3. There are four advantages to final pipeline layout: (1) Closed circuit permits use of smaller pipeline due to dual flow to high demand branch; (2) Simplifies pipe sizing (tapering sizes of line limits future flexibility of extension.); (3) Crossover line uses least valuable floor area; (4) Valves permit continued service to "A" or "B" or both during line repairs or extensions. Studying the preliminary layouts will disclose other built-in maintenance areas, Figs. 4. and 5.

Construction Schedule Chart—The true barometer of any project is the construction schedule chart. Of course, copies should be prominently posted and up-to-date for all to see. Its function is to establish the sequence of operations by classifying them and establishing the starting, running and completion dates. Thus the inter-dependence of one operation on another prior operation is obvious.

Among the innovations you might consider for your next project is using working days rather than calendar dates. This allows for contingencies of weather or other setbacks without requiring date changes on existing paperwork. It is well to remember that the same date (working day) system should be read into contracts for outside material and contractor service.

Construction Site Plot Plan—To keep peace within the new and enlarged facilities, no building construction project should be without a construction site plot plan, Fig. 6. The planning of the construction site plot plan is merely a matter of experience due to the innumerable variations of its requirements, but correction of errors is easy due to its temporary nature. It is realized that the scene progressively changes as construction phases are completed, but foresight will keep this work within the usual allowance for contingencies. **End**

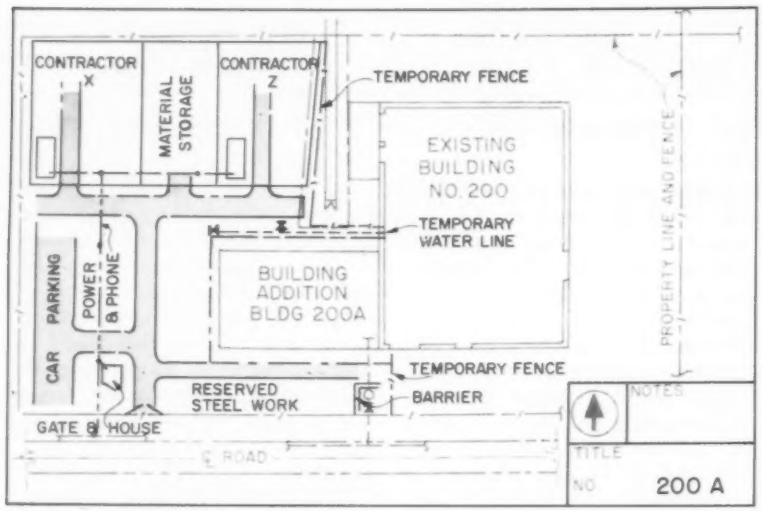


Fig. 6. Work with construction site plot plan to keep peace within new facilities.

Fig. 1. Operator scoops out desired amount of sodium chloride from bin for dyeing operations.

BULK HANDLING

Even a Small Operation Can Use It to Advantage

BULK MATERIAL handling which already has found its way into most industries, recently entered the carpet and rug industry. The Beattie Carpet and Rug Company, Little Falls, New Jersey, is using the bulk handling system to store and distribute chemicals throughout the plant. These chemicals are used for dyeing wool and other processes in rug manufacture.

The system in use was developed and engineered by Tote System, Inc., and consists of five hermetically-sealed aluminum containers. These 74-cu ft capacity containers are carrying about 6000 lb of sodium sulfite and sodium chloride weekly.

Normally, this type of bulk handling system is used only for large operations, where tons of material are moved daily. In using this system for small quantity operations, the company has derived many benefits.

First, before the containers were installed, a number of 100-lb bags of material were dumped on plywood and scooped up as needed, but this created a two-fold problem;

1. Housekeeping chores in such an operation were extensive.
2. The hygroscopic nature of both chemicals created a severe problem in such humid atmosphere as was encountered in the dyeing room. Also, loss through moisture pick-up was extensive.

Second, the storage of many bags presented a problem. Sixty palleted bags take up more room than one container.

Third, outside storage was impossible before. Now, the containers can be left outside in rain or cold weather without fear of product damage.

Fourth, the danger of bags breaking and loss through spoilage and contamination has been eliminated. **End**

Fig. 2. Hosing down the floor in the dye room was a problem before because of the hygroscopic materials handled.

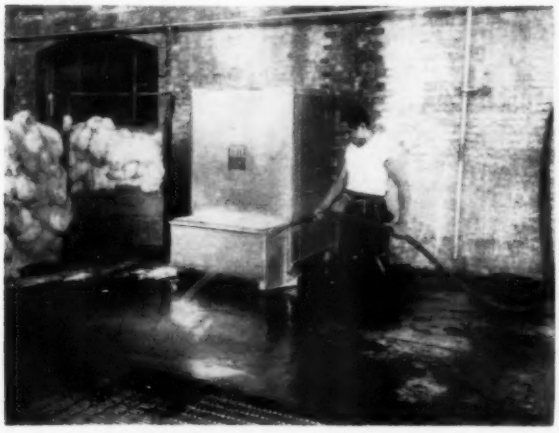


Fig. 3. Containers are easily moved and can be stored outdoors, providing additional storage space inside the plant.

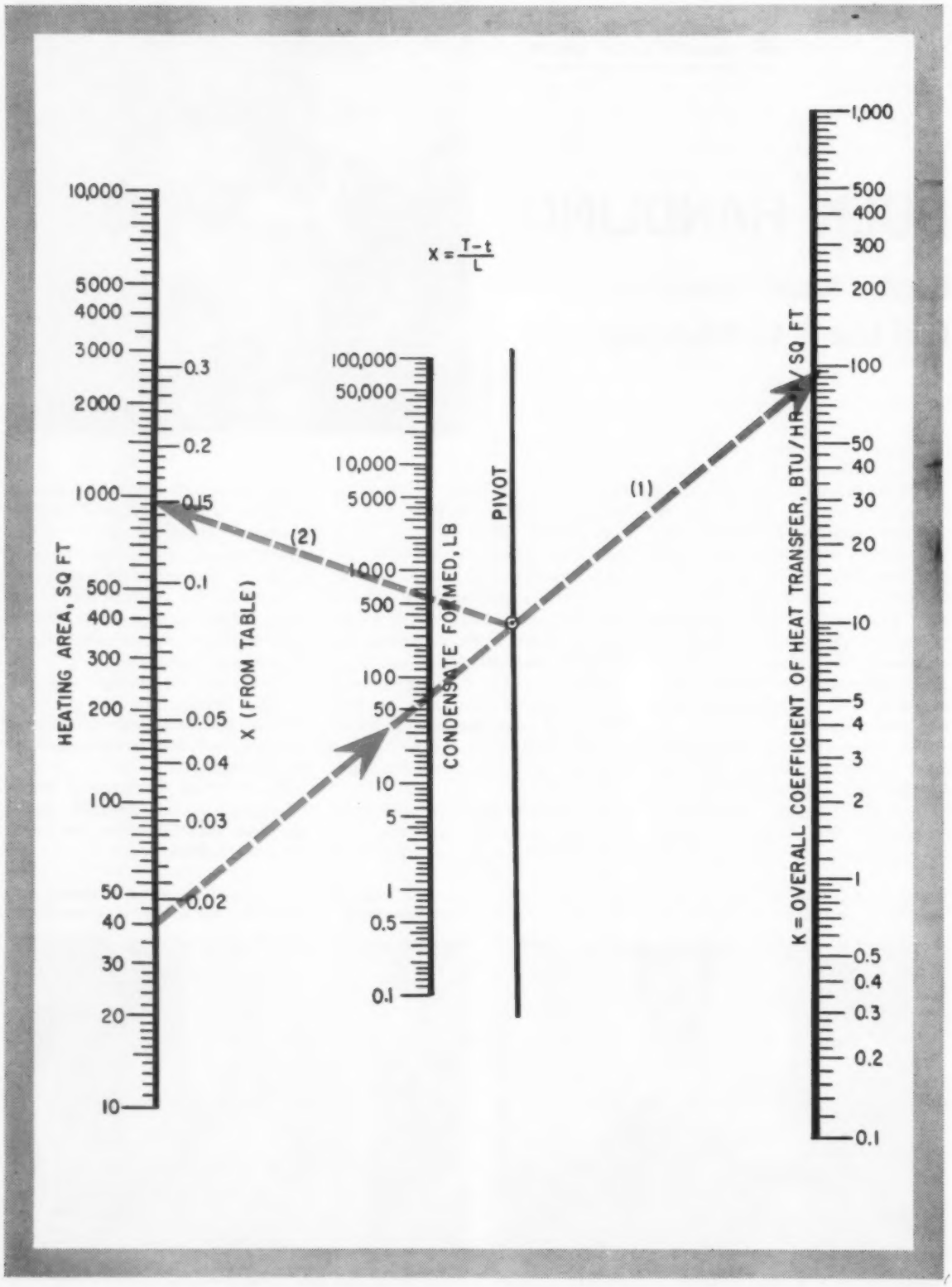

$X = \frac{T-t}{L}$
HEATING AREA, SQ FT
10,000
5000
4000
3000
2000
1000
500
400
300
200
100
50
40
30
20
10
X (FROM TABLE)
0.3
0.2
0.15
0.1
0.05
0.04
0.03
0.02
CONDENSATE FORMED, LB
100,000
50,000
10,000
5000
1000
500
100
50
10
5
1
0.5
0.1
PIVOT
(1)
(2)
K = OVERALL COEFFICIENT OF HEAT TRANSFER, BTU/HR / SQ FT
1,000
500
400
300
200
100
50
40
30
20
10
5
4
3
2
1
0.5
0.4
0.3
0.2
0.1

CHART FOR SIZING CONDENSATE LOADS

2. Determining Condensate Formed In Submerged Heating Surfaces

By WM. G. STEINMILLER, Research Engineer, Yarnall-Waring Co., Chestnut Hill, Philadelphia

SUBMERGED heating surfaces are widely used throughout industry to heat various liquids—water, oil, fuels, and process fluids. The amount of condensate formed in these heating surfaces must often be computed. Usually, the quantity of liquid heated is not known, so the problem becomes somewhat more complex than when the amount of liquid heated is known. But by using the accompanying chart you can easily compute the condensate load.

To use this chart you must know the area of the heating surface, the pressure of the steam used for heating, the temperature rise of the liquid, and the over-all coefficient of heat transfer of the heating surface. These factors are applied in a typical problem:

Example: How much condensate is formed by a 40-sq ft heating surface having an over-all heat transfer coefficient of 100 Btu per hr per sq ft per deg F if the steam pressure is 25 psig and the temperature rise is 140 F.

Solution: Enter the chart at the left at 40 sq ft and project to the right to the over-all coefficient of 100. In the table read the value of X as 0.150 at the intersection of the readings from 25 psig and 140 F. From the intersection of the first line with the central pivot, project through X = 0.150 on the left-hand scale. At the intersection with the condensate scale read amount of condensate formed as 600 lb.

The quantity of condensate found from this chart is that formed during the heating period. This span may be any interval—1 min, 10 min, 15 min, or 1 hr. If the above heating took place during a 10-min interval, the hourly condensate load would be found by multiplying 600 by the ratio of 60 to 10, or (600) (60/10) = 3600 lb per hr.

This chart may be used for any liquid heated by any kind of a heating surface, so long as it is submerged in the liquid heated. The ranges chosen for this chart are sufficiently wide to permit its easy use in the average industrial submerged heating surface problems. **End**

Table I. "X" at various pressures and temperature rises.

Pressure, psig	Temperature rise, F								
	40	60	80	100	120	140	160	180	200
5	0.042	0.062	0.083	0.104	0.125	0.146	0.167	0.187	0.208
10	.042	.063	.084	.105	.126	.147	.168	.189	.211
15	.042	.064	.085	.106	.127	.148	.169	.191	.212
20	.043	.064	.085	.106	.128	.149	.170	.192	.213
25	.043	.064	.086	.107	.129	.150	.172	.193	.214
30	.043	.065	.086	.108	.129	.151	.172	.194	.215
35	.043	.065	.087	.108	.130	.152	.173	.195	.216
40	.044	.065	.087	.109	.130	.152	.174	.196	.218
50	.044	.066	.087	.110	.132	.154	.176	.198	.219
60	.044	.066	.088	.111	.133	.155	.177	.199	.221
75	.045	.067	.089	.112	.134	.156	.179	.201	.224
100	.045	.068	.091	.114	.136	.159	.182	.204	.227
125	.046	.069	.092	.115	.138	.162	.184	.207	.230
150	.047	.070	.093	.117	.140	.163	.187	.210	.234
175	.047	.071	.095	.118	.142	.165	.189	.213	.236
200	.048	.072	.096	.120	.144	.167	.191	.215	.239

Nomograms in the Complete Series

The first chart of the series was published in the September, 1958 issue of Plant Engineering. That particular nomogram deals with the determination of the amount of condensate formed in heating liquids and solids. Charts pertaining to the following items will appear in forthcoming issues:

3. Condensate formed with excess heat exchange area.
4. Condensate formed in air heating coils.
5. Condensate formed in coil-type space heaters.
6. Application of trap safety factors.

What's the Chart Based On?

This chart is based on the relation: $C = KAX$

C = condensate formed during heating, lb

K = over-all coefficient of heat transfer, Btu/ deg F/ hr/ sq ft

A = heating area, sq ft

$X = \frac{T - t}{L}$

T − t = temperature rise of substance heated, deg F

L = latent heat of the heating steam at the trap operating pressure, Btu/ lb

DETERMINING EQUIPMENT REPLACEMENT NEEDS

Careful analysis of obsolescence, wear, productive capacity, and maintenance points way to intelligent capital spending

By R. A. BUTLER
Plant Engineer
Titusville Divisions
Struthers Wells Corp.

Date _____
By _____

REQUEST FOR APPROPRIATION

Approved _____ Date _____

For _____ Shop, _____ Division _____

(To Replace) (As additional capacity for) (As innovation):

Description of proposed machine (new) (used): _____

Cost: $_____ Freight: $_____ Installation: $_____ Total Cost $_____

COMPARISON OF MACHINES

	OLD	PROPOSED
Size & Manufacture		
Type		
Heads		
Table Size		
Max. Stroke		
Cutting Speeds		
Return Speed		
Feeds		
Max. under rail		
Between Housings		
Swing		
Max. Centers		
Spindle Speeds		
Spindle Size or Bore		
H. P. Main Drive		

MACHINE UTILIZATION

Hours of use in: 19__ _____ Hrs.
19__ _____ Hrs.
19__ _____ Hrs.
19__ _____ Hrs.

Expected Use _____ Hrs. / Year
Remarks:

Max. Cu. In. Metal removal per hour or parts produced

Proposed Machine to replace: _____

Purchased in _____ at cost of $_____

Remaining value _____ $_____

Salvage Value _____ $_____

Maintenance costs in past year $_____

Current Burden Rate $_____/Hr

Current Labor Rate $_____/Hr

Expected Total Annual Saving $_____ Expected Rate of Return _____%
(Refer to computations on return of Capital Investment)

Fig. 1. This is one portion of the form used by Titusville Divisions in determining whether old equipment should be replaced or repaired.

ONE OF THE major obligations of the Plant Engineering department at Struthers Wells Corporation is the constant accumulation of data, appraisals and evaluations needed to determine the economic advantage of proposed capital equipment replacement. One of our objectives is that we be prepared to exploit every opportunity that arises for sound capital expenditures. We accomplish this by preparing a schedule of replacements. This schedule is determined by careful analysis so that the most important replacements are made first.

The degree to which a manufacturing plant surveys and acts upon its re-equipment policy has profound influence upon its productivity and earnings. In this era of modern technology and critical competition modern manufacturing techniques demand equipment of increased power, speed and exacting precision.

From the standpoint of metal cutting, a machine may be satisfactory but in cost cutting it may be obsolete. This is true because obsolescence results from physical wear and tear as well as from deterioration of its accuracy, tolerance and economical operation. As consistently as improved cutting tools arrive, machine tool builders admirably endeavor to keep pace.

Since the advent of semi-high-speed tool steel or Mushet Steel about 1868 and Stellite about 1915, cutting tool materials have undergone a major evolution—to a point where they are capable of operational speeds sometimes exceeding any available machine's rating.

Therefore, in modern technology, functional degradation of equipment tends to overtake a machine tool rapidly—more so than is recognized, incidentally, by Treasury Regulation Bulletin F. The inflated cost of modern replacements requires that close

COMPUTATION ON RETURN OF INVESTED CAPITAL

COST OF NEW MACHINE - $_____

	Old Machine	New Machine
A. Direct labor cost/hour	$_____	$_____
Hourly burden rate	$_____	$_____
Total Hourly operating cost	$_____	$_____
Divided by maximum cubic inch metal removed or parts produced per hour units	( )	( )
Total labor cost per cu in. metal removed or per part produced	$_____	$_____
B. Proposed machine capacity _____ (cu in.) (parts) per day		
At $_____ per (cu in.) (part) on old machine		$_____
At $_____ " " " " new machine		$_____
.. Labor savings per day		$_____
Annual savings, labor (250 - 8 hr days)		$_____
C. Annual rate of recovery of capital invested in new machine, ____years profitable life		$_____
Amount recovered annually tax-free by _____ year depreciation schedule (1/2 of above)		$_____
Additional amount to be recovered annually out of profit		$_____
Earnings required annually before taxes (at ___%) to recover above amount		$_____
Annual capital recovery required over _____year period; $_____from depreciation plus $_____ from profit before taxes		$_____
D. Total annual savings		$_____
Required annually for recovery of capital		$_____
Annual net return on investment		$_____
Rate of annual return on capital invested; annual net return of $_____ divided by $_____, the cost of new machine		_____%

Compiled by _____ Date _____

Fig. 1. Part 2. When both these sheets have been filled in completely plant engineering has a documented case to present to general management.

scrutiny be applied to any tool which at first glance appears eligible for replacement. It requires more than an assumption or premise that a machine will probably save money — it must, if necessary, be substantiated to the nth degree.

Inflated cost refers to the fact that replacement of a certain machine priced at $17,796.00 in 1915 today entails a $430,000.00 investment—or as discovered in another case—an engine lathe costing $35,682.00 in 1917 may be replaced with a modern standard model of about the same capacity for $185,000.00.

Selection of expensive tools in their proper order to achieve a balanced re-equipment goal requires some sort of yardstick because so many of the factors to be considered in a major investment are of an intangible nature.

Age of a machine is no criterion for decision on replacement, but it is frequently discovered that many machines are kept well beyond their proper point of retirement. Investigation often reveals certain intangible losses. These losses may be due to occasional spoilage because of inherent inaccuracies, lost production time because of perhaps minor but frequently recurring breakdowns, or to general operational difficulties familiar only to the operator who tries to compensate for the condition of his machine at each setup.

Regardless of age, if a machine can operate smoothly at the proper speeds it may be capable of using carbide tools. However, to realize the full advantages of carbides, ceramics and other modern cutting tools, the proper cutting speeds must be available at all diameters. In addition, the machine must embody rigidity to overcome vibration and must be driven with adequate power to permit maximum metal removal per unit of time while maintaining precision at all its speeds and feeds.

An intensive analysis of a particular machine tool begins not only when the key barometer of repair costs is rising and a major overhaul seems pending; but also, as general comparisons of existing machines are made against their modern counterparts.

When considering any machine for possible replacement we scrutinize its challenger for:

1) Increased metal removing capacity and possible elimination of a bottleneck.

2) Lower indirect labor costs.

3) Labor saving devices or automation to some extent.

4) Improved quality of the finished product.

5) Combination of operations on a single machine.

6) Pacing the operator rather than the operator pacing the machine.

7) Lower maintenance costs and reduction of downtime or outage.

This approach to the investigation is aided by such information as: the per annum maintenance costs for each tool; the hours of machine utilization; regular tool inspection reports; burden and labor rates; together with the equipment history and other relevant data.

More often than not it is necessary to supplement such data by conducting time studies. In the case of a very old machine, about which little may be known, we actually dismantle it if necessary to diagram and inspect the mechanism for a thorough analysis of its capabilities. This may

R. A. Butler/B/gd
12/3/57

- INVESTIGATION -

Comparing obsolete Drills with Modern Machine

	Two (2) Existing Drills #3317 & 4302	Modern Radial Drill
Main Drive H.P.	15 & 10	20
Spindle Speeds	15/500 & 40/400	10 to 1250
Range of Feeds/Rev.	0.005" to 0.040"	0.004" to 0.125"

- Performance -
Drilling 2" Dia. tube holes thru 5/8" steel plate

Spindle RPM	80	153
Surface Feet/Min. (S.F.M.)	42 Ft.	80 Ft.
Feed per Rev.	0.014"	0.020"
Penetration per Second	0.019"	0.051"
Total Drilling Time	33 Secs.	13 Secs.

- Performance -
Drilling 3/8" Dia. pilot holes thru 1/2" steel plate

Spindle RPM	500	816
Surface Feet/Min. (S.F.M.)	49 Ft.	80 Ft.
Feed per Rev.	0.006"	0.012"
Penetration per Second	0.050"	0.162"
Total Drilling Time	10 Secs.	4 Secs.

Assume operator efficiency at 50% and allowing time for set up and positioning for drilling 2" diameter tube holes, production rate on old machines would be about one (1) hole per minute and on modern machine about two (2) holes per minute; therefore:

Hourly Production	60 Holes	120 Holes
Cost per hour	$ 6.25	$ 6.25
Cost per hole	$0.104	$0.026

Fig. 2. Left: This is a supplementary sheet used for determining costs per cubic inch of metal removed by these machines.

Fig. 3. Below: When data is collected it is transferred to MAPI form that permits comparisons between the old and new equipment.

When it is believed we have exhausted all alternatives in our studies and confirmed all angles, the final work sheets are made up. With the supporting information properly organized, a report is submitted to management for consideration.

This policy of reviewing excess or obsolete capacity at regular intervals helps provide the necessary facilities that enable us to produce high quality capital goods at maximum economy.

A decision not to replace when replacement is indicated can, in short order, prejudice a firm's competitive position. As a major tool manufacturer consistently and aptly reminds the readers of his advertisements "The man who needs a machine tool is already paying for it." **End**

be considered superfluous but in a particular instance when replacement of a 16-ft vertical boring mill was under investigation, and realizing the high cost of a new machine, we wanted to prove beyond doubt that it was not only eligible but overdue for scrapping.

All the necessary information concerning a machine or tool under study is collected and entered on the form shown in Fig. 1. This form assists in determining the expected saving and rate of return. Supplementary data in connection with metal removal is gathered by observation, time study and calculations. These, when compiled and reviewed permit determination of costs per cubic inch of metal removed under all conditions. See the comparison of radial drills and their performance, Fig. 2.

The rather complete compilation of data is then transposed or translated to the prefabricated work sheets, Fig. 3, of the Machinery and Allied Products Institute (MAPI), titled "Re-Equipment Analysis and Operational Comparison."

Proceeding a step further, theoretical base studies are prepared and the comparative annual costs are calculated such as Capital Recovery or Annual Cost, Capital Cost and Present Worth.

RE-EQUIPMENT ANALYSIS AND OPERATIONAL COMPARISON

WORK SHEET — SEE SUMMARIZING REPORT AND RECOMMENDATIONS (PAGE 1 OF 2). SEE REVERSE SIDE FOR OTHER CALCULATIONS.

DATED 12-2-57 — NUMBER 58 — PAGE 2 OF 2

1 SUBJECT OF ANALYSIS: 10'-16' Betts Vertical Boring Mill

2 HOURS WORKED: 19.... 19.... 19.... 19....

3 TOTAL REPAIR COSTS IN 19 56 - $3,170.00

4 ASSUMED RATE OF PRODUCTION: Present Level

	A — PRESENT EQUIPMENT—DEFENDER	B — PROPOSED EQUIPMENT—CHALLENGER
6A/B DESCRIPTION	10'-16' Betts VBM, 10'-2" table, 6'-3" under tool	16 Ft. Vertical Boring Mill 14'-0" table, 9'-0" under tool
7 MACHINE NUMBER / DATE PURCHASED	3230 / 1902	MAKE AND SOURCE
8 LOCATION / INSTALLED COST $	#2 MS / 13,215.	COST OF UNIT $ 385,000. INSTALLATION $ 10,000. TOTAL $ 395,000.
9 DISPOSAL / SALVAGE OR CONVERSION VALUE $	Sell As Is / 5,000.	ESTIMATED PRIMARY SERVICE LIFE 15 / ESTIMATED TERMINAL SALVAGE $ 77,000.

	OPERATIONAL NEXT-YEAR ADVANTAGES (DIFFERENCES)	A DEFENDER TOTAL	A DEFENDER ADVANTAGE	B CHALLENGER TOTAL	B CHALLENGER ADVANTAGE
11	INCOME ADVANTAGES	$	$	$	$
12 A/B	SUPERIORITY OF PRODUCT				43,209.
13	INCREASED OUTPUT				
14	OTHER				
15	OPERATING COST ADVANTAGES				
16	DIRECT LABOR, INCL. OVERTIME & SHIFT PREMIUMS	7,420.		7,420.	
17	SET-UP TIME				
18	INDIRECT LABOR)				
19	"FRINGE" LABOR COSTS)	12,320.		12,320.	
20	ORDINARY MAINTENANCE)				1,500.
21	SPECIAL REPAIRS	1,500.			
22	TOOL COSTS				
23	SUPPLIES				
24	DEFECTIVE MATERIAL—REWORK				
25	SPOILAGE—SCRAP				
26	DOWNTIME—OUTAGE	1,968.			1,968.
27	POWER CONSUMPTION	1,467.	2,202.	3,669.	
28	FLOOR SPACE, IF USABLE				
29	PROPERTY TAXES AND INSURANCE				
30	SUB CONTRACT COSTS	43,507.			43,507.
31	OTHER				
32 A/B	TOTALS	$ 68,182.	$ 2,202.	$ 23,409.	$ 90,184.

33 DEFENDER OPERATING INFERIORITY (NET CHALLENGER ADVANTAGE) 32B-32A $ 87,982.

	A — ADVERSE MINIMUM—DEFENDER		B — ADVERSE MINIMUM—CHALLENGER	
34				
35	OPERATING INFERIORITY (LINE 33)	$ 87,982.	COST INSTALLED (TOTAL 8B)	$ 395,000.
36	SALVAGE VALUE LOSS, NEXT YEAR	$ 1,000.	PRIMARY SERVICE LIFE (9B)	15 Yrs.
37	INTEREST @ 8 % (X LINE 9A)	$ 400.	TERMINAL SALVAGE VALUE (9B)	$ 77,000.
38	CAPITAL ADDITIONS, TOTAL $		SALVAGE % (37B OF 35B)	20%
39	NEXT YEAR PRORATION	$	CHART 7 % INT. 8 % TOTAL	15%
40	INTEREST @ % (X LINE 38A)	$	TOTAL % X COST INSTALLED (39B X 35B)	59,250.
41	TOTAL, OMITTING LINE 38		ANNUAL AVERAGE PERIODIC CAPITAL ADDITIONS	$ 2,000.
42	ADVERSE MINIMUM	$ 89,382.	ADVERSE MINIMUM (40B + 41B)	$ 61,250.

43 NEXT YEAR GAIN FROM REPLACEMENT (42A MINUS 42B) $ 28,132.

ANALYSIS BY R. A. Butler/d — APPROVED

DE-RUSTING, DE-SCALING PISTOL

Chisels, Needles, Compressed Air Do Safe Job

ANOTHER SWISS import will likely be finding a place for itself in American industrial plants. This one, called the Von Arx Pistol, is designed to perform tough de-rusting and de-scaling operations. Operating on compressed air from any normal industrial compressor, the pistol drives hardened steel needles—or chisels—for practically any job such as stripping paint, roughing and cleaning up stone and brickwork, and chiselling out pipe or conduit channels.

Action of the pistol is controlled by a trigger on the handle. Air continually flows over the working surface, removing rust, paint or what have you, leaving the surface visible and clean. Normal working pressure is 88 psi and air consumption is 12.5 cfm.

Among the tool's advantages listed by the manufacturer are: 1. No dust or interference with production. The pistol is said to raise little dust and to not interfere with production because the tool can be brought to the work—not vice versa. 2. No danger. There are no particles of sand, scale or shot flying about, it is said, even inside tanks and containers. 3. No inaccessible points. The pistol, with the needles and chisels provided, reaches almost everywhere. Weld seams, laps, rivet runs, angle plates, all get cleaned. 4. No expensive maintenance. Maintenance costs are restricted to the average required for other compressed air tools.

Two alternative needle sizes are employed in the gun. The larger, but shorter, pointed needles are used for breaking through really hard scale where indentation of the parent metal will not matter. The chisel-end needles do similar work but merely leave a slight surface marking.

For brick, stone and metals where it is important that the surface not be marked, 2 mm needles are supplied. These have a definite polishing effect. In addition a set of three chisels is provided with each outfit. These are generally used for chipping, breaking and scraping. **End**

Want More Information?

If you do, just drop a line to The Editor, Plant Engineering, 308 East James St., Barrington, Ill., or write "Von Arx" on one of the postage-paid cards to be found elsewhere in this issue, and drop it in the mail.

Fig. 1. Aside from maintenance, epoxy is used as bonding cement for metal washers in a 75 kw resistance heater.

Fig. 2. Exhaust pipe passing through outside wall is sealed to stop ammonia fumes from coming back into building.

REPAIRING CORRODED TANKS, PIPES,

OFTEN REPAIRS to pipes and pumps handling corrosive materials must be made on an emergency basis to avoid costly shutdowns. And because of the need for quick action, repairs are likely to be temporary at best, leading to a vicious circle of maintenance emergencies.

Such maintenance has been made much easier with an epoxy resin repair material that is chemically stable, non-shrinking, non-flammable and strongly adhesive to iron, steel and aluminum. These compounds are proving that they can go a long way toward keeping maintenance simple and repairs permanent.

This material, available in an easy-to-use repair kit manufactured by Smooth-On Manufacturing Company, Jersey City, N. J., can be used to repair tanks, pipes and conduits handling virtually any liquid, gas or powder, and for smoothing and caulking. Since it is oil and water proof, it resists most dilute acids and alkalis and can withstand temperatures up to 250 F and pressures up to 1000 psi.

Here are a few examples of how these epoxy resin materials can speed up repairs, with considerable savings in both time and material costs.

As the result of a search for a chemical setting compound that forms a tough, metal-like vibration proof joint, a utility now uses epoxy resin for leaks on turbine oil piping and on turbine flanged joints. It was found that the compound hardens into a tight joint and that absolute tightness can be obtained even with a fitting that has to be backed off a half turn during assembly. A permanent joint is desirable in this usage because turbine oil piping is well provided with unions or flanges.

The Shell Oil Company, Ardmore, Okla., has used the material in two applications, to repair the deck of a crude oil storage tank perforated by corrosion, and to repair a steel tank containing produced subsurface brine.

In the first case, a laminated patch was used to cover a hole approximately three feet square; in the second, a one-square-foot patch, subjected to a 10-ft head of salt water, was applied to the corroded area. These repairs replaced the earlier method of welding steel plate to the tanks.

Similar use of the epoxy resin compounds has been made by Jarvis Brothers & Marcell, Decatur, Ill. Here laminated glass cloth patches were used

Fig. 3. Epoxy resin cement is being applied to the outside ductwork to seal the joint and provide a permanent repair.

Fig. 4. Here is just another example of the various applications of epoxy materials—repairing a leak in a pipe joint.

CONDUITS WITH EPOXY MATERIALS

to correct leaks in steel tanks containing crude oil and corrosive brine. The patches are subjected to fluid temperatures ranging from 40 to 80 F, with a maximum pressure of 10 psi.

Stauffer Chemical Company's Niagara Falls, N. Y., plant used the compound for the tops of closed storage tanks, for a reaction vessel, and for a catalyst chamber in a carbon tetrachloride plant. The repairs have proved entirely satisfactory and have not contaminated any of the processes involved.

Repair of liquid containers is not the only application in which epoxy resin compounds have proved successful. Pratt and Whitney's West Hartford, Conn., plant has used the material to repair dry exhaust collector systems.

In this case a collector was lined with glass cloth and epoxy resin, and, although it was necessary to cover the entire interior of the cone with the laminating system, these repairs kept the equipment out of service only a few hours.

The comparative cost: about $100 as opposed to costs ranging from $2000 to $5000 in previous methods which required replacement of entire sections or cones and, at times, replacement of the complete collector.

Despite the manufacturer's doubts about repairing copper, a material with which epoxy resin usually has a poor bond, Procter & Gamble's Baltimore plant used the compound to repair a leak in a 3/8 in. thick copper wash tank.

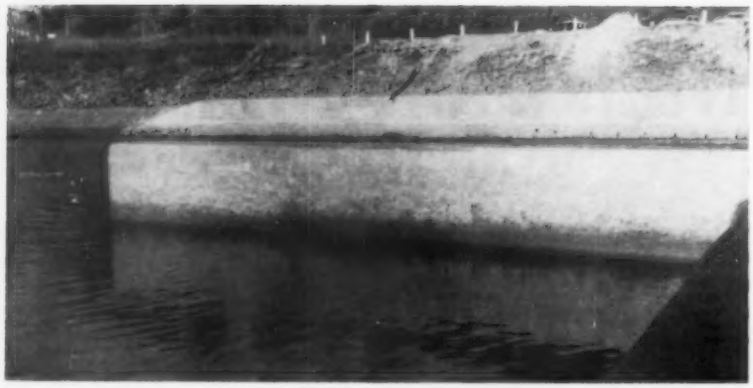
Although the leak was about eight inches above the normal liquid level and not subject to head pressure, immediate repair was essential because the area of the leak is continuously sprayed with acid wash water.

The leak was plugged with a tapered copper plug driven in from the outside. When the head of the plug was filed off flush with the exterior surface, four layers of epoxy resin and glass cloth lamination about six inches square were applied. This repair has held up and no new leaks have appeared.

Other applications of this material are: caulking metal air lines, cast iron joints, ceramics and concrete pipe, as pipe thread cement where permanent joints are needed, as a lining for concrete and metal piping to prevent corrosion and for bonding metals, wood, concrete and glass. **End**

BEFORE REPAIR

DURING REPAIR



AFTER REPAIR

CONCRETE STRUCTURE REPAIR

Using Non-Shrinking Grout With Pre-Placed Aggregate

BY JOHN C. KING, Chief Engineer, and
JOHN HOFER, Regional Manager, both of Intrusion-Prepakt, Inc., Cleveland, Ohio

THE STORY of how one company solved maintenance problems in connection with deteriorated concrete structures, and solved them under trying conditions, is told here. Most important was the fact that rehabilitation work was accomplished without affecting normal plant operations. The processes used to effect the repairs are especially applicable to industrial plants located on water, but are equally effective in restoring any masonry or concrete structure.

West Penn Power Company's Lake Lynn power station is located on the West Virginia-Pennsylvania state line and dams the Cheat River about three miles above its confluence with the Monongahela River. The powerhouse tailrace and trash sluices are separated from the spillway section by a concrete baffle wall approximately 50 ft long, 3 ft thick and 16 ft high from tailrace apron. At low water periods this baffle extends some 8 ft above tail water; during floods it is completely submerged.

At the right of the tailrace, the earth and rock embankment is protected by a concrete retaining wall which extends a distance of 167 ft from the powerhouse. The wall has an over-all average height of 23 ft. The lower 12 to 17 ft is massive in section and cast against bedrock. The upper 6 to 10 ft is cantilevered from the base section and retains an earth embankment which rises another 16 ft or so to a service road.

A survey in 1955 by engineers of West Penn Power Company showed that both the baffle and retaining walls had suffered extensive frost deterioration and spalling which was especially pronounced in the 6-ft zone between high and low water. A section of concrete at the downstream end of the baffle wall in the zone of water fluctuation was completely gone. There was also considerable spalling on portions of the cantilever section of the retaining wall, this deterioration being probably accelerated by splash from the heavy turbulence that occurs in the tailrace during turbine operation.

During the summer of 1956 a contract was awarded Intrusion-Prepakt, Incorporated, of Cleveland, Ohio, to remove and replace the deteriorated concrete and generally rehabilitate the baffle and retaining walls. There was to be little or no interruption to the normal operation of the power plant. Work began early in August and was completed before the end of October. These repairs were greatly facilitated by the choice of the grouted aggregate method of placing concrete.

This grouted aggregate method consists of filling, with mortar, the voids in preplaced coarse aggregate. The coarse aggregate may be either gravel or crushed rock, similar to that used for ordinary concrete except as to grading. To provide passage for proper flow and distribution of the mortar, called Intrusion mortar, the minimum size of coarse aggregate particles is limited to ½ or ¾ in. The maximum size is that which is economically available and convenient to handle or as limited by the spacing of reinforcement and forms.

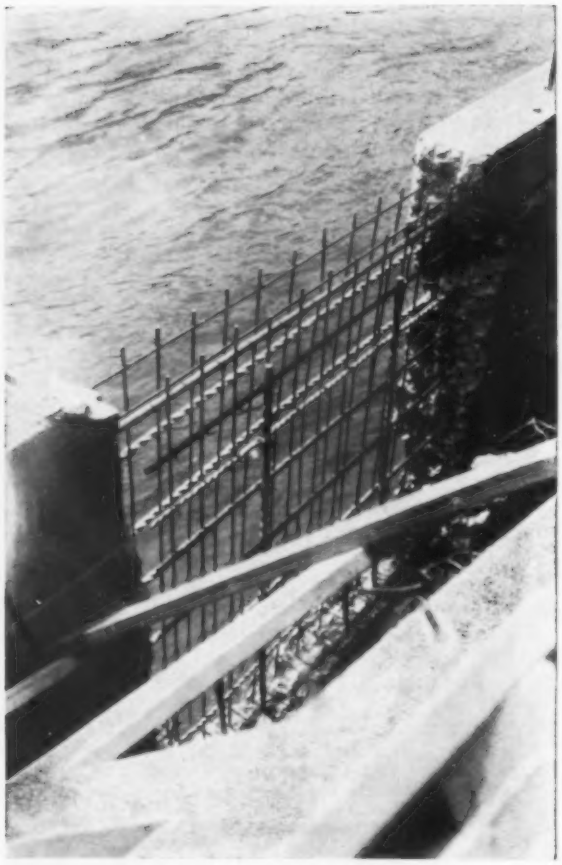
This type of repair work is performed by first removing all deteriorated and weakened material with chipping hammers to expose sound concrete. Forms are then erected and filled with clean, graded coarse aggregate. Finally, this Intrusion mortar, a specially prepared non-shrinking grout of low water-cement ratio, is intruded into the voids of the coarse aggregate to produce Prepakt concrete.

The highly fluid characteristics of a properly prepared grout cause it to penetrate the surface voids of the roughened, existing concrete surfaces to establish near-perfect initial bond. A slight expansion during hardening eliminates the effects of setting shrinkage and consequent stress on the contact surface. Drying shrinkage, where drying is possible, is more than halved by the point-to-point contact of the preplaced aggregate.

Result is that the new concrete is so thoroughly and tightly bonded to the old concrete that frost action cannot attack the joints. The new concrete contains entrained air which provides excellent resistance to freezing and thawing.

At this project many construction problems had to be solved. To begin with, it was necessary for the West Penn Power Company to operate the turbines for all but 4 to 8 hr on some days and

Retaining wall at low water during period of repair. Existing concrete below the form (left of center) has been chipped back to sound concrete. Scaffolding further back was removed before turbines went into use each afternoon.



Upper, cantilever section of retaining wall. Deteriorated condition required complete removal of concrete in area.

around the clock on others when power requirements for the system remained high. While the turbines were in operation, flow in the tailrace was very turbulent and the water raised 6 to 7 ft above non-operating level. Normal working time for the contractor was not much more than 4 hr per day on the lower portion of the wall.

This required close coordination between the owner and contractor. The chief dispatcher advised the contractor's superintendent the approximate time that the turbines would be cut off and, of course, when they would be put on again. The superintendent would then get all in readiness to take advantage of the low water, dropping higher level work as soon as the gates closed.

Scaffolding was prefabricated in short sections for manhandling and designed to hang from the top of the wall. As soon as the removal of concrete in a section was completed, holes would be drilled in the remaining sound concrete, and form ties firmly cinched into place. Forms were then firmly attached and the space immediately backfilled with coarse aggregate. At this point, turbine downtime was usually about over, and the scaffolding was removed for re-use next day or later.

Normally, Prepakt concrete is placed without regard to submergence conditions, but here turbulence was such that workmen could not properly control this operation when the turbines were running. Hence, the mixing and pumping would be accomplished at a later date—usually after two or four forms had been set and backfilled.

As soon as the mortar-grout had been pumped into the coarse aggregate, water could flow past the forms without affecting quality of the concrete. Where concrete replacement extended below low water, no attempt was made to dewater the forms because, as mentioned above, the presence of still water is immaterial provided the mortar is pumped into the aggregate beginning at the bottom.

In addition to the removal and replacement of concrete, certain other work was accomplished. To facilitate repairs to the upper section of retaining wall where the full section had to be replaced some excavation was required. Weep holes were cast in the new concrete sections so that when excavated areas were backfilled with gravel, water could not pool behind the wall to exert excessive pressure especially during freezing weather.

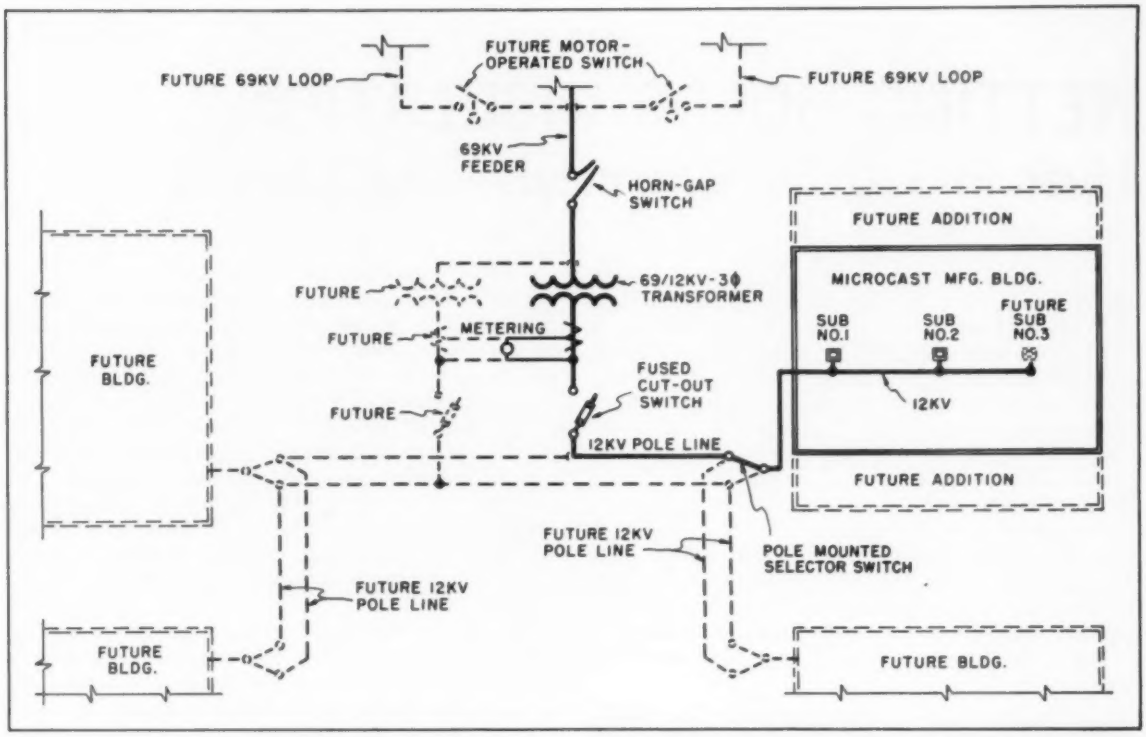
At the downstream end of the retaining wall, the original construction included a rip-rap paved transition section from the vertical wall to the natural slope of the bank. This rip-rap had been covered with a few inches of sand-mortar which was breaking up. This area was repaired by replacing missing rip-rap, then drilling through the existing mortar cover and consolidating the rip-rap blanket with grout.

In addition, ungrouted rip-rap was also placed on the embankment above the retaining wall over the excavated and backfilled areas and to replace missing stone in adjacent areas.

In addition to portland cement, sand, and water, Intrusion mortar contains Alfesil and Intrusion Aid. Alfesil is the trade name for a finely divided siliceous material which replaces from 30 to more than 50 per cent of the cement which would otherwise be required and which reacts with the lime liberated by the cement during setting to form insoluble strength producing compounds. The lime-Alfesil reaction also greatly reduces permeability at later ages.

The Alfesil particles separate the cement grains in the fluid mortar delaying initial set and, being spherical in shape, improve the flow characteristics of the mortar. Intrusion Aid, used in very small quantities, gives the mortar the properties of a colloidal suspension: eliminates completely the effects of settling and setting shrinkage; lowers the water requirement to a value comparable with that of ordinary concrete; delays early stiffening of the mortar; and provides, in the hardened concrete, the weather resisting characteristics of the best air-entrained conventional concrete.

The work described in this article was accomplished under the supervision of D. W. Molter, Chief Mechanical Engineer, and C. R. Parrish, Hydrographer, West Penn Power Company, Greensburg, Pennsylvania. The information given in this article also was presented before the Structures and Hydraulics Committee, Pennsylvania Electric Assn. at Pocono Manor, Pa., Jan. 1958. **End**



Present and future primary connections show careful attention to future electrical capacity needs at this large plant site.

PRIMARY PLANNED FOR FUTURE

Capacity Permits 650 Per Cent Expansion

HOW would you plan a primary distribution system to take care of present loads and permit a fourfold increase in future loads? Here is one solution worked out by engineers of the Wigton-Abbott Corporation at the Austenal Company's new precision casting plant at La Porte, Indiana.

Planning of the initial building anticipates a 70 per cent expansion of the manufacturing area and ultimate full development of the site might constitute four such expanded buildings.

Space was provided for the utility to install a 69-kv to 12-kv outdoor substation. As the load grows, the utility will build up the transformer capacity to suit.

Indoor substations and distribution centers are spotted centrally to the electrical loads inside the plant. Bus duct grids distribute 3 phase, 480-v power throughout the area. Small dry-type transformers rated 480 volts to 120/208 volts are connected to the power bus ducts to serve the lighting system and receptacle circuits.

The pole line, from the utility's substation to the building, is arranged for double crossarming so that an additional 12-kv feeder may be run in the future without modification. In addition, the initial 12-kv feeder is sized to accommodate the load of one additional building.

Thus the basic arrangement is planned so that growth in any size increments up to a full 650 per cent of the initial building may be made economically, efficiently and without large capital expenditures. All initial equipment will fit into the fully developed arrangement.

Increased capacity is gained by adding 480-v substations as required. The two 1000-kva substations and the bus duct grid in the initial building have sufficient spare capacity to permit a 25 per cent load growth. In addition, the 12-kv feeder is sized so that one additional substation may be added if required.

When anticipated plant growth permits, two 69-kv to 12-kv transformers, operating in parallel, will feed a common 12-kv bus in the utility substation. Two separate 12-kv feeders will be brought to each building with a two-position selector switch located at each building. Normally one-half of the buildings will be on each feeder. Should one feeder or one of the high voltage transformers fail, the remaining transformer and feeder will be able to maintain essential services to all the buildings.

The utility proposes to bring in dual 69-kv feeders and install selective switching at its substation when this growth potential is realized. This arrangement will make outages virtually impossible. **End**

NETTING HOLDS INSULATION

Lives in Salt Air, Chemicals—and Likes It

NICKEL-COPPER alloy insulation netting used on outdoor digester, washer and settling tanks, has solved several difficult maintenance problems for Reynolds Metals Company's Sherwin Alumina Plant at Corpus Christi, Texas.

Netting is used to secure and reinforce the insulation. After application of the netting, the exteriors of the tanks are painted with a tar-asphalt mixture to afford further protection to the insulation.

The generally warm climate of South Texas permits use of the outdoor type of plant construction. The open structures, however, are exposed to attack by the weather, particularly the salt air that blows in from the Gulf as well as industrial fumes.

The salt-laden atmosphere presents a corrosion problem. Ordinary metals exposed to this atmosphere quickly disintegrate. But the biggest hazard to the life of insulation netting is the hot caustic solution within the tanks, which sometimes spills over or seeps through breaks to attack the metal.

Selection of this netting for holding insulation in place was the result of unsatisfactory and uneconomic experience with previous materials.

Insulation netting used is a 1-in. hex mesh, 3-twist netting fabricated from 0.028-in. Monel wire by Gilbert & Bennett Manufacturing Company, Georgetown, Conn. It is furnished to the job in 4-ft by 300-ft rolls.

The Monel hex-mesh netting assures a strong, tight, lasting cover for the insulation. It resists many corrosive atmospheres ranging from sea air to industrial fumes, and withstands assault by moisture or heat, acids or alkalis.

It has not been possible to establish precisely the comparative life of the metal netting at the Sherwin Alumina Plant since none of it has yet deteriorated. Some of the netting has been in use since 1953, when the original plant installation was completed. The only failure reported was the result of a storm of near-hurricane proportions. In this instance the failure was due to physical damage, of course, rather than to corrosion or other chemical action.

The Sherwin plant does not produce refined aluminum, but takes the red bauxite ore through half the process, winding up with alumina.

At one stage in the process, sodium aluminate is separated from impurities by passing it through a series of thickening and settling tanks, after which it is filtered. A fine-screen Monel filter leaf is used for this part of the process which settles the red mud from alumina in a caustic liquor. **End**

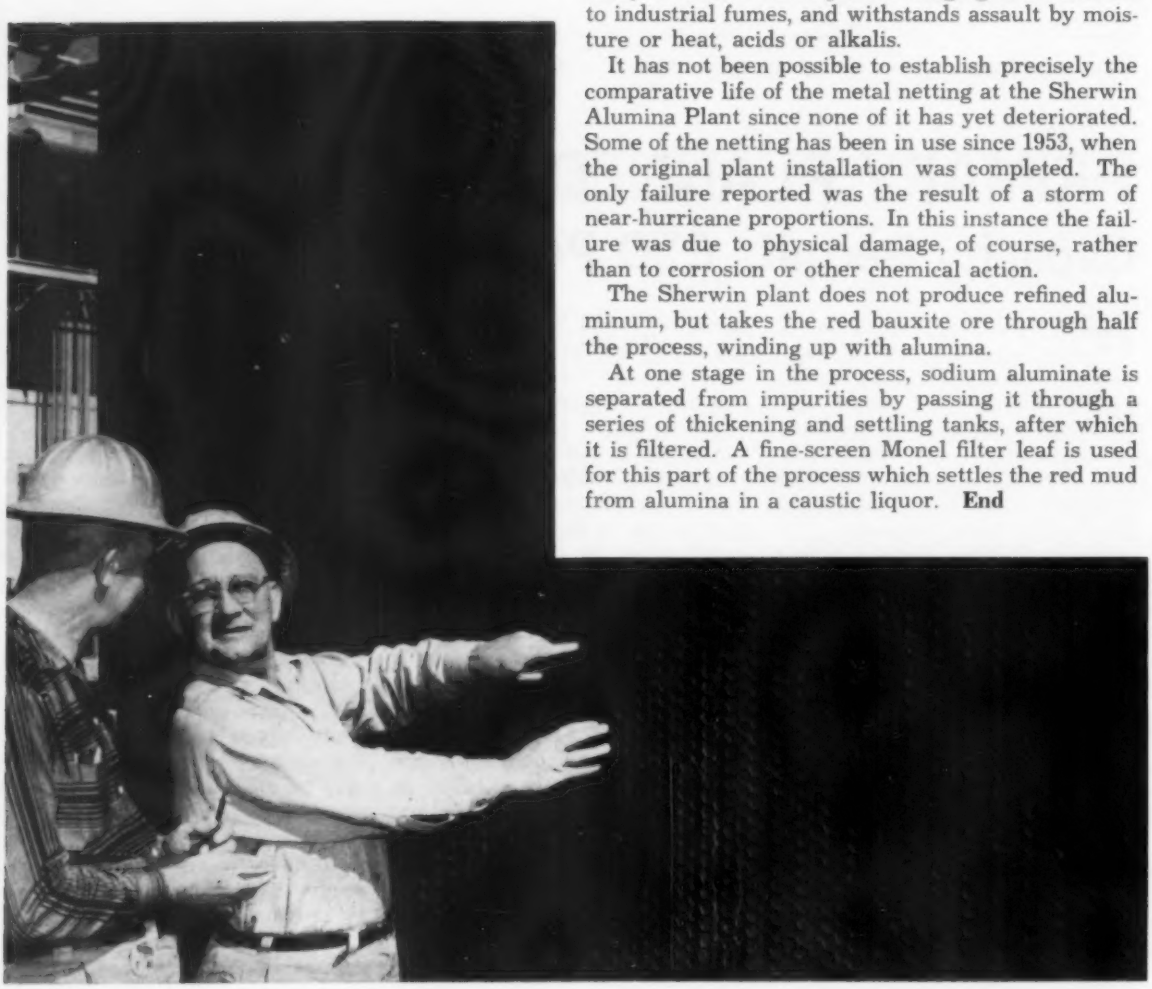


Fig. 1. Jacketed coater roll is heated by the hot oil to maintain asphalt at 350 F temperature. Roller picks up asphalt in trough and transfers it to kraft paper.

HOT OIL HEATER AIDS PROCESS

Saves Company $20,000 Annually

By DAN MERRILL, Plant Engineer, Baldwin-Hill Company

PREVIOUSLY pre-coated asphalt paper was used at our Temple, Texas, plant to enclose insulation batts. From cost experience in our other plants, we estimated that a savings of up to $20,000 per year could be made by coating our own paper and applying it directly on the production line.

While part of this saving is from the cost differential between the pre-coated material and the cost of coating it ourselves, a large part of it was derived indirectly as follows:

1. Coated paper requires more warehouse space than uncoated material.

2. Shipping costs are higher on the coated paper.

3. Application of the asphalt coating directly on the production line would simplify paper stocking, provide greater flexibility and allow variations of the coating thickness as required in special orders.

In the design of a system to asphalt-coat this black kraft paper, it was first necessary to find an economical method of heating the asphalt to 410 F. Systems utilizing electricity, gas and oil were investigated and a final decision was made to use a new process using hot oil as a heating medium.

Heating Medium: Hot Oil

This system, recently developed by the Texsteam Corporation, Houston, Texas, was designed for heating crude oil in storage tanks and pipelines and seemed ideal for our particular operation.

Due to the abundant supply of cheap natural gas in the Temple, Texas, area, this fuel was selected to provide the necessary heat.

Texsteam engineers recommended one of their modified automatic modulating hot oil heaters for this application. This unit operates on a gas pressure of 1 psi at the burner, and is equipped with a complete set of safety controls which provide automatic shut-off if any unsafe operating condition is present. In addition, it is equipped with an internal CO_2 fire extinguisher to meet the requirements of the Factory Insurance Association.

The oil system contains 378 gallons of Sinclair Rubilene medium heavy oil. This oil has a viscosity of about SAE 40 and is specially processed to remove the coke forming elements, which would cause operational difficulties at temperatures up to 440 F. The oil temperature is automatically

maintained at the proper operating level.

Pump on the heater operates at about 22 psi and circulates the oil through the steel coils in the heater where the oil temperature is raised to 425 F. The oil then flows through the heat exchange pipes in the bottom of the 10,615 gallon asphalt storage tank. This keeps the asphalt in a very fluid state at about 410 F.

Two other pumps maintain a flow of hot oil through a 2 in. jacket around the 220 ft of 1¼-in. asphalt piping. This jacket is covered with insulation to reduce the heat loss to an absolute minimum, and the heat from the oil keeps the asphalt inside the inner pipe at the proper temperature.

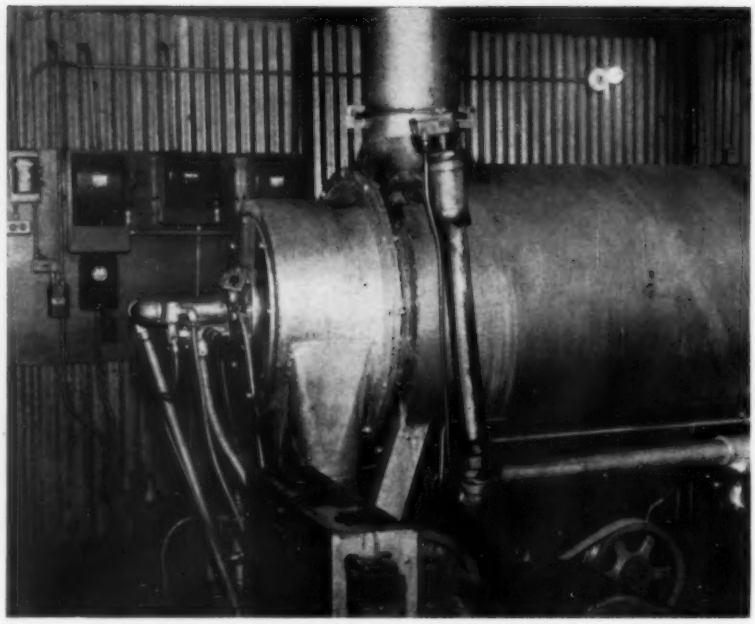


Fig. 2. Hot oil heater operates on a gas pressure of 1 psi and is equipped with set of safety controls. Unit maintains oil temperature at proper operating level.

How Asphalt Is Applied

This line carries the liquid asphalt from the storage tank to the coater trough located directly under the point of paper application on the main production line. The hot oil then flows through the outer jacket around the coater trough which is 14 ft long, 14 in. deep and 14 in. wide. The hot asphalt from the line flows into this trough and is maintained at a temperature of 350 F.

Hot oil from the pipe-line jacket flows through a steel jacketed coater roll, which is 13 ft long and 14 in. in diameter. This cylinder is partially immersed in the asphalt in the coater trough, and as it rotates, a thin coating of asphalt is picked up on its surface. This asphalt is transferred to the kraft paper shown in Fig. 1, and two additional oil heated cylinders keep the coating hot until it is finally applied to the surface of the mineral wool. The hot asphalt then penetrates the mineral wool blanket and provides a strong bond between the paper and the wool.

With the advent of new high temperature oils, hot oil exchange systems are becoming more feasible over a wider range of temperatures. However, it has been discovered that only steel or cast iron piping can be used to hold the hot oil in these systems. Other materials have been found to develop an electrolytic action which causes a change in the pH and encourages sludge formation. This inevitably results in reduced oil flow and finally a complete stoppage of the entire system.

While operating on a continuous seven-day a week basis, the company has been able to pay for the new equipment out of savings made during the first nine months of operation. **End**

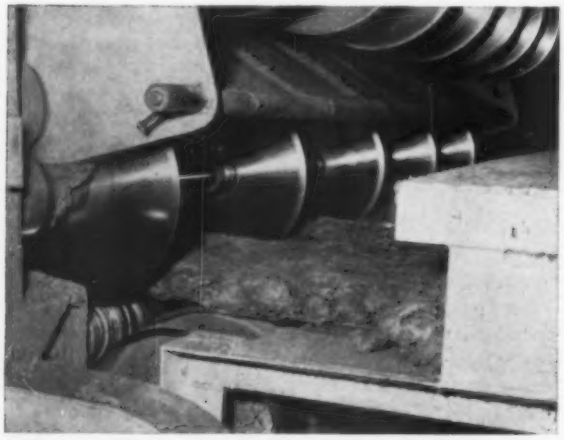


Fig. 3. The insulating material is cut into desired sections.

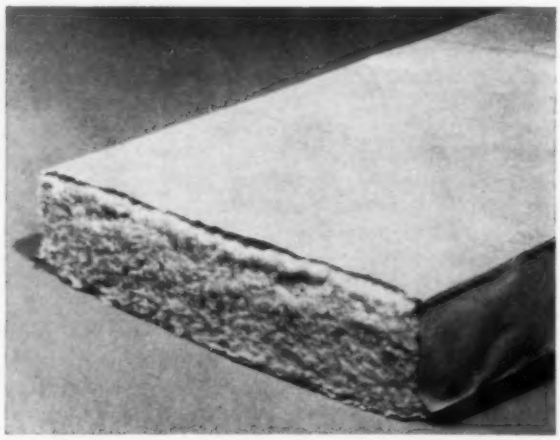


Fig. 4. Here is how the finished insulation batt looks.

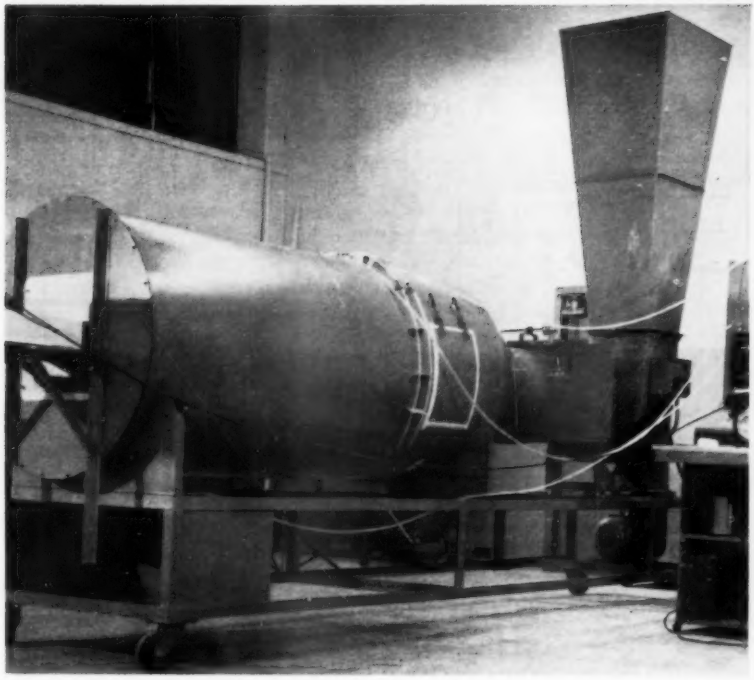


Fig. 1. The fans to be put under test are connected at the left end of the mobile tunnel. Fan at the right end along with the adjustable damper is used for simulating duct conditions.

Plant-Engineered Fan Testing Tunnel

TEST ENGINEERS at Trade-Wind Motorfans, Inc., Rivera, California, needed a wind tunnel for establishing correct fan characteristic curves, and the company's own Plant Engineering Department provided what is proving to be a fully adequate answer. The wind tunnel, while hardly of NACA dimensions, serves for full and comprehensive testing of the many varieties of ventilator and heater fans made by this firm.

This tunnel, which is approximately 16 ft long, may be considered to have fore and aft chambers. The fan to be tested is mounted at the front plate of the forechamber. In this position it discharges air into forechamber.

The forechamber and aftchamber are separated by a nozzle plate which contains five orifices of carefully precalculated airflow characteristics. The aftchamber of the tunnel precedes an adjustable speed blower which helps produce conditions in the aft section to simulate a duct system to which the fan under test may be ultimately attached.

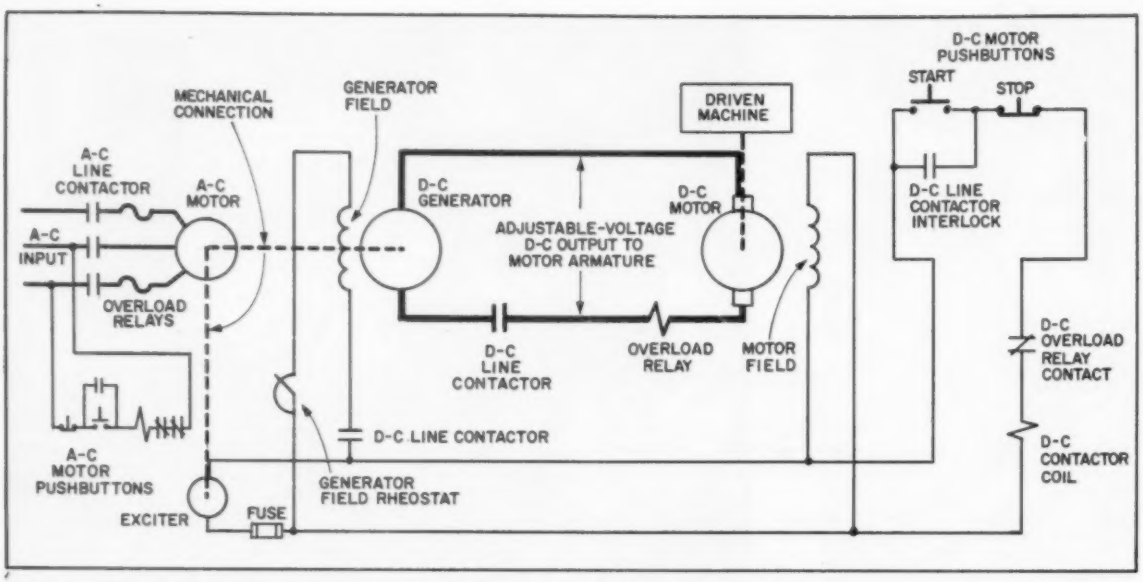
An instrument console contains equipment for accurately measuring the air pressures in the tunnel at all times. Also, voltage to all electrically driven elements of the tunnel is controlled at the console.

Four 0.040-in. diam static pressure taps in each of the two chambers permit passage of air under pressure into instrumentation tubing. The pressures are consequently transmitted to the console.

Of course, there is some resistance to airflow through the plate nozzles which can be adjusted for small or large volumes of air. The known airflow characteristics, plus air pressure readings are used to calculate the amounts of air the fans under test would deliver under simulated duct conditions.

This "home-made" wind tunnel, constructed in accordance with the code of the Air Moving and Conditioning Association can be used for establishing fan characteristic curves on fans delivering from 10 to 3000 cfm of air. **End**

Fig. 2. The instruments and gages are located conveniently on a movable stand.



D-c adjustable voltage drive system commonly known as Ward-Leonard system. All components except d-c motor are enclosed in a ventilated enclosure. Speed range of d-c motor is governed by operation of generator field rheostat.

WHY ADJUSTABLE SPEED DRIVES?

Production Advantages Pay For Higher Cost

By J. W. O'LEARY, D-C Motor and Generator Department, General Electric Company, Erie, Pa.

ADJUSTABLE speed conveyors have become a key tool in providing the flexibility necessary to mass production installations. There are many types of adjustable speed drives available. Let us confine ourselves to those driven by electrical power because of their almost exclusive use on production conveyor drive applications.

A list of these drives would include types such as the a-c constant speed motor and gear shift, the a-c constant speed motor and adjustable belt system, wound rotor a-c motors with secondary resistor control, brush shifting a-c motors, constant speed a-c motors and adjustable excitation eddy current clutches and the d-c adjustable voltage drive commonly known as the Ward-Leonard system.

Most versatile of these adjustable speed drives is the d-c adjustable voltage system. It consists of a motor generator set with an a-c motor that takes power from a conventional a-c power source. The a-c motor drives a d-c generator at a constant speed. A speed control rheostat is used to adjust the field current in the d-c generator and this in turn adjusts the d-c output voltage at the armature terminals of the generator.

The output voltage of the generator is connected to a d-c motor and the speed of the d-c motor is proportional to the generator output voltage. Additional speed adjustment can be made by changing the field current in the d-c motor.

In its basic form, this system requires an a-c starter and pushbutton station for the motor generator set and a contactor and pushbutton station to connect the d-c motor to the generator. The real flexibility of this drive lies in the ease with which additional functions can be added to the system.

Some of the additional functions important to adjustable speed production conveyors are ease of controlling the speed and operations from several widely located points, fast emergency stops, controlled acceleration to operating speeds and adaptability to speed regulating systems where the motor speed is held to close tolerance in spite of changes in drive load.

Other advantages include ability to follow the speed of other machines or tie in conveyors, control from limit switches or process instruments, ease of reversing direction of motor rotation and adaptability to position synchronizing with other machines.

Because of high initial cost, d-c drives were usually applied only to the more complicated adjustable speed production conveyors. Several factors have led to their increased use on less critical production conveyors.

Plant engineers have recognized the advantage of selecting a drive

so that future requirements could be easily obtained with a minimum of new investment. Studies show that the cost of the conveyor drive usually runs about five per cent of the total conveyor cost.

Other industries were also experiencing a similar increased demand for d-c adjustable speed drives. Electrical manufacturers soon realized that they could best serve this accelerated demand by standardizing design and construction. This would shorten the manufacturing cycle for the drives and reduce costs. The reduced cost and improved delivery actually accelerated the demand because new applications were found where the d-c drive was now the most economical.

This was an evolution process and out of it arose the modern packaged adjustable d-c drive with the motor generator set and control devices housed in a steel enclosure and wired by the manufacturer.

Adjustable speed drives are easily adapted to process requirements where a repeat cycle or a sequence of events is required in the operation. They can be controlled by the position of a limit switch, industrial sequence timing relays and process instruments that measure temperature, pressure, other physical phenomena.

In an increasing number of applications accurate speed is essential. As an example, the production conveyor may be carrying parts through a drying or baking oven. Although it may be necessary to adjust the speed for different parts or finishes to obtain the correct amount of time in the oven, once the time is established, the speed must be accurately held to keep the oven time constant. This is accomplished in a d-c adjustable speed drive with a feedback type speed regulated system.

An adjustable speed reference tells the drive at what speed it should be operating. The speed reference is set by the operator to the desired speed level. The system incorporates some type of accurate speed measuring device such as a tachometer generator.

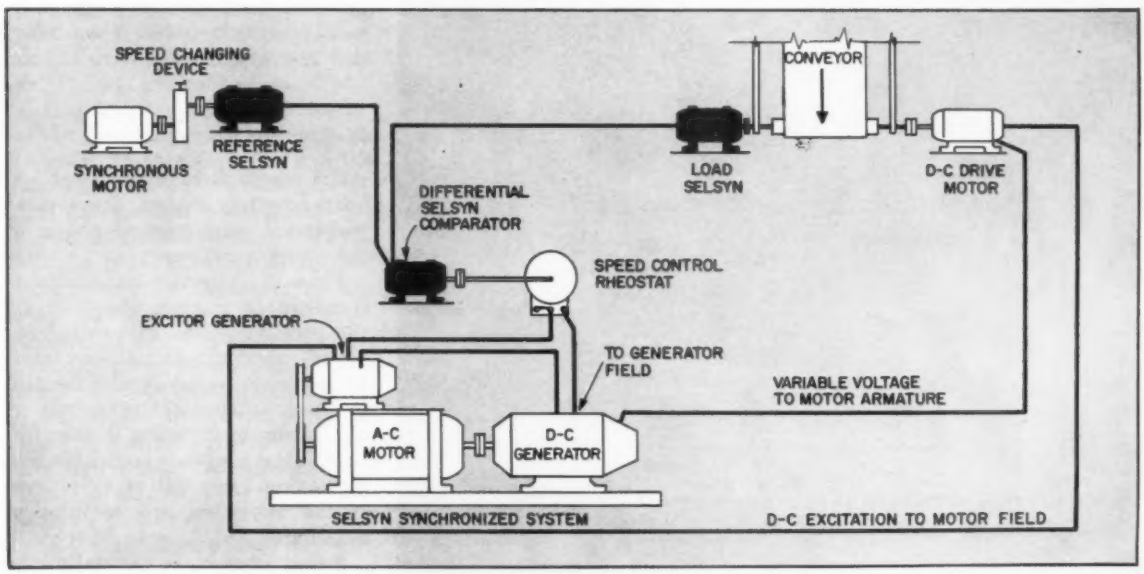
Voltage signals from the tachometer generator are compared to the operators setting. If there is a difference or error between the desired speed and the actual speed, the speed regulator acts to correct the error and bring the speed back to the desired level. This is technically known as a feedback type closed loop system and can be used to accurately control the speed of one conveyor or can be used to make a second independently driven conveyor accurately follow the speed of a master conveyor.

A more accurate speed regulating system makes use of the Selsyn. In this system, position error develops a signal that is used to correct the speed so that an accumulative speed differential does not develop. A fractional horsepower synchronous motor is used to drive a reference Selsyn at a constant speed through an adjustable gear set.

A feedback Selsyn is driven by the conveyor and the output of these two Selsyns are compared by a differential Selsyn. If the reference and feedback Selsyns are rotating at the same speed, the differential Selsyn does not rotate.

However, if for any reason the conveyor slows down, the differential Selsyn will rotate at a speed proportional to the difference in speed between the reference and feedback Selsyns. The motion of the differential Selsyn is used to drive a rheostat which controls the excitation of the d-c generator field and acts in a manner to correct the difference in speed caused by the conveyor slowdown.

This feedback system is satisfied only when the speeds of the reference and feedback Selsyns are exactly the same. The adjustable gear driving the reference Selsyn is used to set the desired conveyor speed. This system can also be extended to synchronize independently driven conveyors. **End**



Differential Selsyn control system maintains close speed settings under various load conditions. Shaft position of reference Selsyn and load Selsyn are compared by differential Selsyn which operates rheostat to bring system back into step.

Cereals Get "Heat Treatment"

Grain Products Automatically Sterilized

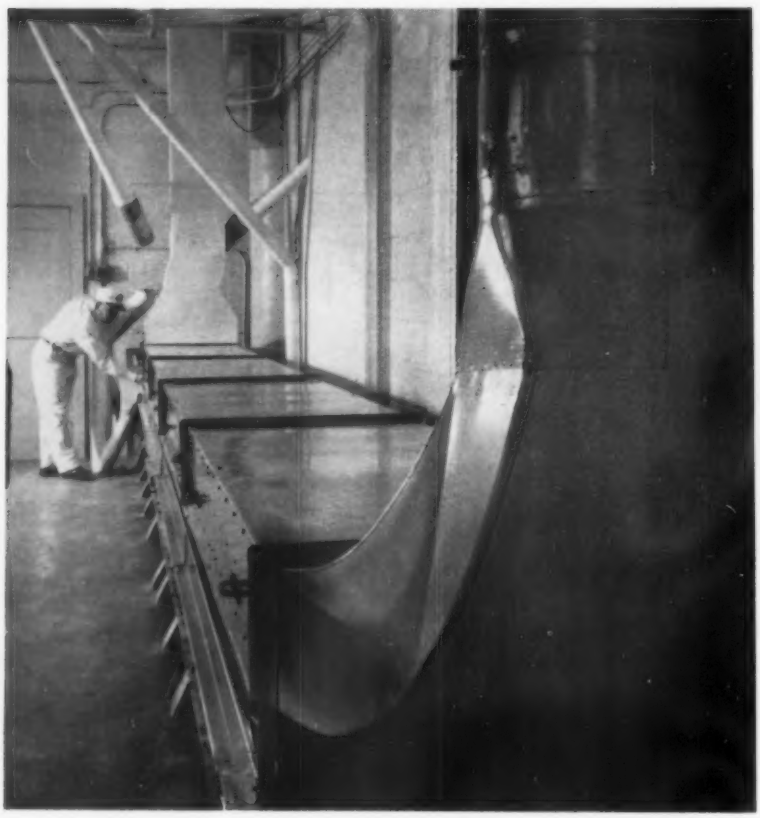
ELECTRONICALLY-controlled sterilization of grain products is part of a modernization program completed recently at the Fisher Flouring Mills Co., plant in Seattle, Wash. The system will insure the complete sterilization, by heat treatment of each particle, of processed grain passing through it.

Fisher's new method of sterilizing granular products represents months of engineering and testing. The result of this work was an unusual sterilizer which is completely automatic in its operation.

Formerly, the plant sterilized its granular products with a steam-jacketed, screw-fed unit that had been standard equipment in the milling industry for many years. The unit was difficult to clean and its use resulted in costly crushing of granular products.

The new sterilizer has none of these disadvantages. It is an oscillating, stainless steel trough 25 ft long and 20 in. wide, which thoroughly and automatically sterilizes products as they pass through it in 30 seconds. Because of this speed of operation, electronic temperature controls and safety devices were incorporated into the system to enable the fast adjustments required for different products to be made.

Fig. 1. Gravity falls are provided between each of four sections of the oscillating trough in which the grain products are sterilized at approximately 265 F.



The sterilizer is installed directly below bulk storage bins from which materials are discharged by gravity into the sterilizer's vibratory feeder. From here, materials are fed directly into oscillating sieves. Speed control is applied at this point.

Intensity of vibration, which determines the rate of flow through the sterilizer, is controlled manually with the feed-rate control unit at the packaging line.

Sieves are integral parts of the sterilizer. A pneumatic collection system spouts the scalps, or oversize particles, and the fines, or undersized particles, away from the sterilizer. The sieve tailings are spouted off into sacks. The remaining material passes through the oscillating stainless steel sterilizer trough, which is heated with a grid of tubular heating elements under each of the sterilizer's four sections. These low watt density elements provide even heat distribution by radiation and convection. Gravity falls of 1¼ in. are provided between each of the four sections to assure complete mixing and uniform heating.

Electronic Controls

Electronic devices are used for heat and safety control. Speed control is the only manual phase of the sterilization process.

Flow of materials through the sterilizer is started manually at the packaging line by turning on a feed-rate control unit. Any later adjustments in the rate of flow of products through the sterilizer are made by turning a selector dial on the feed-rate control at the packaging line. All other phases of the operation are completely automatic.

Speed control is manually operated as a safety factor. If speed of flow were automatically reg-

ulated, materials could jam up in the spouts from the sterilizer when the packaging line could not keep pace. This would result in automatic shut-off of the system, thereby doing away with the advantage of automatic operation.

By being able to manually preselect the speed of flow to conform with the packaging operation during any period of the day's work, the packaging line receives the full benefit of a completely automatic sterilization system.

Heat Control

Surface temperature of products passing through the sterilizer is held to a maximum of 265 F. This is controlled with over-heat thermistor probes installed in each of the four sections of the sterilizing trough.

Basic heat control is maintained at the spouting end of the sterilizer, where a Fenwal Series 560 proportional controller keeps the temperature of the product at 165 F as it leaves the sterilizer. In addition, it controls the electric input to all four sections of the trough, which results in maintenance of the exact, required ratio between the time the heat is on and the time it is off. Should the proportional controller fail, the thermistor probes will control the heat independently.

To prevent upsetting this proportioning ratio, an input controller is installed in series with the Fenwal 560 controller.

The system's safety devices include four primary installations between the storage bins and the packaging line.

If the product plugs up in the duct feeding the sterilizer from the storage bins, a switch is tripped which turns off the heat. In this way, the sterilizer cannot overheat.

If the drive motor fails on the conveyor that feeds the sterilizer, a torque switch on the eccentric shaft of the conveyor drive stops the flow from the storage bins, again turning off heat in the sterilizer.

If the packaging line stops, or the spout feeding it is plugged, a control in the spout turns off the product feed and sterilizer heat.

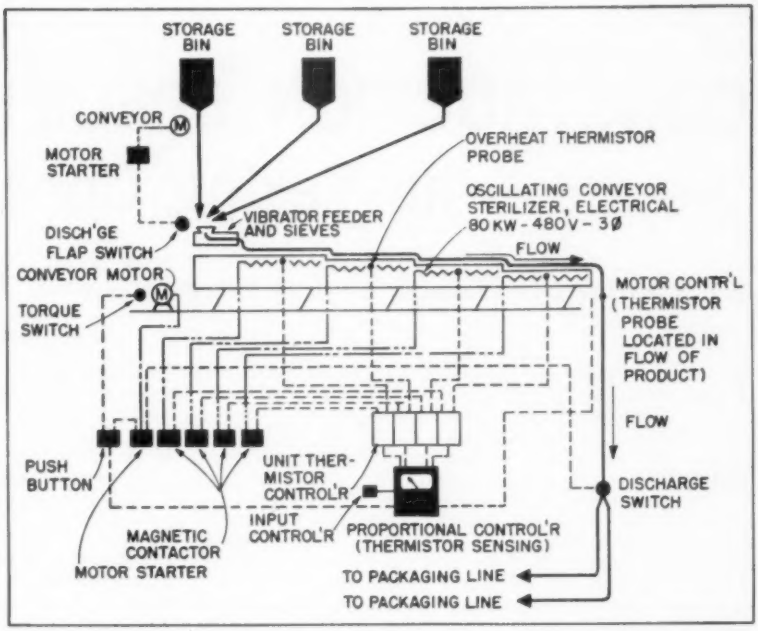
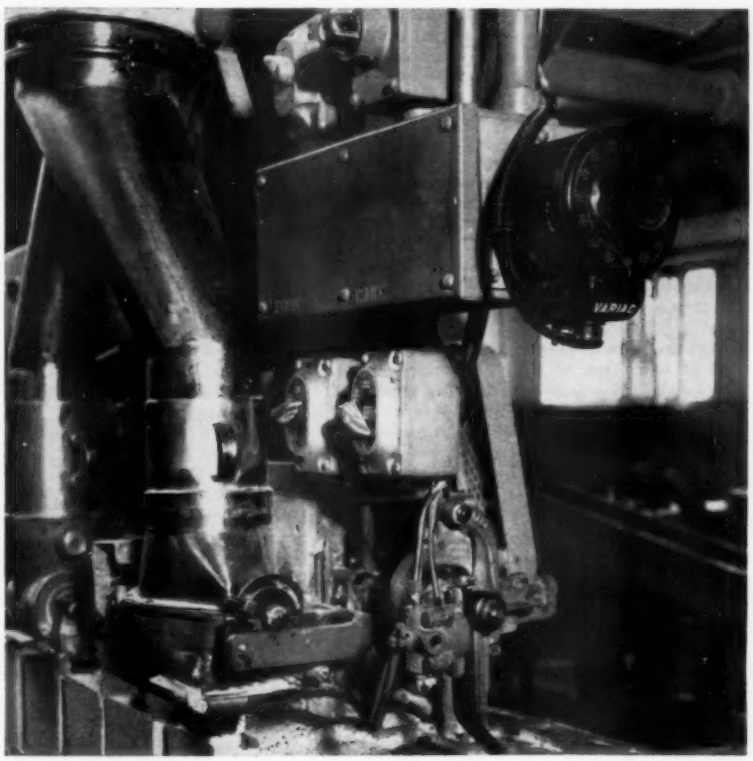


Fig. 2. Diagram of cereal flow through automatic sterilizing and packaging line.

The conveyor in the sterilizer continues to run, to prevent burning material still in the sterilizer.

Design and construction of the system was handled jointly by Fisher technicians and Frederick P. Colbert of the Seattle office of Montgomery Brothers. **End**

Fig. 3. Intensity of vibration in sterilizer trough determines rate of material flow. Operation is manually controlled by packaging line feed-rate control unit.



CONSTRUCTION SPECIFICATIONS
III. Taking Construction Bids

By R. E. WALLIN, Chief Engineer, Construction, Plant Engineering Dept., Joseph T. Ryerson & Son, Inc.

IN OUR FIRST two articles we discussed plans and specifications in an effort to briefly indicate what items should be covered in a good set of specifications. Let us continue with our hypothetical construction project and review what takes place between the time plans and specifications are ready and bids are in.

Before and during the time that the architects were busy preparing the plans and specifications, general management, from the company president on down the line, joined with you, Mr. Plant Engineer, and the architects in many conferences. In these conferences you tried to cull the good proposals from the many received and incorporate them in the job; to develop and analyze plant layouts to get the best production flow; and to consider construction details. All of this work was done so that you could give your management a plant in which to conduct its business; give them buildings which could be built at a fair initial cost; buildings which will have maximum utility with minimum maintenance cost through future years.

The thinking of all concerned has been made final, and the architects have the necessary information which will require several weeks to be incorporated into final plans and specifications for submission to bidders.

While planning was in progress, many requests had been received from contractors, suppliers, and people who desired to bid and participate in the work. In a conference with the architects, it was decided that the work of all trades would be let to one general contractor, instead of the owner letting the work of some trades separately from the general work. It was also decided to take bids by invitation rather than to invite all comers.

At this point a contractor bid list should be compiled which shows the contractor's name, address, telephone number, and representative's name for every contractor who, it is felt, ought to be considered as an eligible bidder.

It is always a nice gesture from a public relations standpoint to advise contractors and suppliers who are not general contractors but who have asked for a chance to bid on subcontracts. They should be advised to call some designated person at a specified time for the names of the prime bidders so that they can submit their figures to these prime bidders.

Next move is to investigate the qualifications and soundness of each one of the contractors on the eligible list. This can best be done by checking financial ratings, credit agencies, architects, and others for whom the contractors have worked. A good bet is a contractor who has been in business for a long time, has a good financial and credit rating, is honest, has a good reputation, has the respect of those for whom he works, has the respect of those who work for him, has a good performance and completion record, has a staff of key employees that has been in his employ for many years, and has other attributes that will qualify him to be asked to submit a proposal covering the work to be bid.

Experience and know-how is a wonderful asset. Some contractors are good on multistory buildings, some on churches, some on schools, some on mansions, some on ordinary bungalows, some on commercial stores, some on mill buildings, etc.

The size of a contractor is very important. Contractors geared to handle multimillion dollar jobs or those geared to handle $20,000 jobs are not likely low bidders on a $200,000 to $300,000 job. Check and include those on your final list who you feel best qualified to do your type of job. Rate each contractor on the list, and then number them "1," "2," "3," and so on to indicate sequence of choice from the one most qualified to the one least qualified.

To invite too many contractors to bid is hardly fair, because it takes time and money to prepare estimates. Also, if the job is not exceptional and if the plans and specifications are clear and complete, the bids should run very close, and a large number of bids are not needed. Experience indicates that six to eight bids is a good number to invite. Some of these will express their regrets about bidding because they have too many jobs to estimate, or they have as much work booked as they can handle. Sometimes they have bid more jobs than they will be able to handle if most of them come in, or they may feel the job is not to their liking. You might lose one or two, or you might end up with acceptances from all. Even after plans and specifications have been received by a contractor, he may drop out after looking over the plans. You should end up with four to six bidders, to any of whom you can safely give the job as low bidder.

Having determined who will be invited to bid, a letter

Fig. 5. Sample form of letter of invitation to bid. This letter is sent to those contractors who have survived your original elimination process and rate high on your listings.

A. Contractor, Inc.
1 Main Street
Somewhere, Illinois

Gentlemen:

You recently wrote to us indicating your interest in submitting a proposal for doing the general work in connection with the construction of our new office and shop buildings to be built at First Avenue and First Street, Somewhere, Illinois.

Plans and specifications are about ready to send out for bids, and we would like to know if you are still interested in submitting a proposal.

The office will be a one-story building measuring 50′ x 150′, with a partial second story containing office and plant locker and wash rooms. The construction is ordinary noncombustible, of masonry walls, steel sash, concrete floors, suspended metal acoustical ceiling under steel joists, metal deck, insulation, and tar and gravel roofing, year-round air conditioned.

The plant building will be one-story mill type measuring 180′ (three 60′ bays) x 400′ x 30′ high, with a partial basement for heating and air-conditioning equipment. The construction is noncombustible, of sheet metal sandwich and plastic glass walls above eight-foot-high brick walls, structural steel frame, concrete floor, metal deck, insulation, and tar and gravel roofing, steam-unit heated.

All work required to complete the job will be let under one general contract.

Please advise us within ten days of the date of this letter whether or not you wish to estimate this job and submit a proposal.

Very truly yours,

Plant Engineer

Fig. 6. This is a typical form of "Instructions to Bidders" letter which is forwarded to bidders along with specifications. They are designed to allow bidders to bid on same basis.

Instructions to Bidders

A. Contractor, Inc.
1 Main Street
Somewhere, Illinois

Gentlemen:

In accordance with your request to submit a proposal covering general work in connection with a new office building and plant building to be constructed at the corner of First Avenue and First Street, Somewhere, Illinois, we are forwarding herewith prints of drawings, Nos. (give numbers), sheets Nos. (give numbers), and specifications sections (identify section letters), covering (identify titles of sections of specifications), respectively, dated (give date).

Please submit to us your lump sum proposal to cover the work specified in the above mentioned plans and specifications as requested in the specifications and as outlined herein.

Your proposal should include all work outlined in all sections of the specifications as required to complete all construction in the buildings to make them ready for furnishing and occupancy.

Please indicate in your proposal the unit prices for dirt excavating, concrete formwork, pouring of concrete, and backfilling which can be used for computing charges to be deducted from or added to the base price in the event that footings are not carried as deep or are carried deeper than shown on the plans. Backfilling should be figured as outlined in the specifications with the intent that backfilling in the areas of construction activity should not be carried higher than levels which will permit continuance of further work without unnecessary excavation.

You are urged to inspect the site before submitting your proposal.

There is space on the site on which to locate all contractor's shanties or trailers.

We believe that the plans and specifications are complete, to enable you to make a very good estimate. If there are any questions, please contact the architects.

Please submit your proposal on the basis of the plans and specifications, but the owner welcomes your suggestions for substitutions. Any substitutions offered should be outlined in your proposal with the amount to deduct from or add to the base bid for such substitution.

Please indicate in your proposal the amount to be added to or deducted from the base bid if the alternate concrete paving recited in the specifications is substituted for the bituminous concrete paving.

Please identify in your proposal the numbers and the dates of the bulletins, if any, changing the plans and/or specifications which are covered in the bid price.

The owner wishes, for accounting purposes, to be advised in your proposal the estimated costs, each, of the office and warehouse buildings, these two costs being parts of your lump sum proposal.

Please outline in your proposal the percentages to be added for overhead and profit on labor and materials covering work performed on your payroll. Also, the percentages to be added for work performed by subcontractors.

Please state the number of consecutive calendar days required to fully complete all work.

Your proposal should be mailed in a sealed envelope to the attention of (give name and address), for arrival before noon on (give date).

Please return plans and specifications with your proposal.

Very truly yours,

Plant Engineer

Fig. 7. If the owner desires more information that could conveniently be requested in a letter such as that shown in Fig. 6, then this "Form of Proposal" should be sent along.

Form of Proposal

Name of Bidder_____
Address_____ Phone_____

FORM OF PROPOSAL
covering
General Contract work
for Office and Plant Buildings
at First Avenue and First Street
Somewhere, Illinois

Date_____

The undersigned proposes to provide all labor, materials, equipment, tools, supplies, and services required for the construction and completion of the above named project, in accordance with the plans and specifications prepared by_____, and forwarded with Mr._____'s letter of_____ 19____, for_____ ($_____).

It is understood all work is to proceed as rapidly as possible and that all work will be completed in _____ consecutive calendar days.

Alternates and Substitutions. (Describe under this heading, successively, in lettered subparagraphs, the various alternates and substitutions requested, and end the paragraph with "for the lump sum adddition of_____ ($_____)" or end the paragraph with "for a lump sum deduction of_____ ($_____)" or end the paragraph both ways if it might be either an addition or a deduction.)

Unit Prices. (Describe under this heading, successively, in lettered subparagraphs the various unit prices requested, and end the paragraph with "for the unit price of $_____ per_____")

Additional Work. The undersigned quotes the following fees for "extra" work performed upon instructions and/or approval of the owner:

a) Actual monies expended for labor on the undersigned's payroll and for material, plus a sum equal to_____ per cent (___%) to cover overhead, plus a sum equal to_____ per cent (___%) to cover profit; and

b) Actual monies expended by the undersigned to subcontractors for work which undersigned supervises, plus a sum equal to_____ per cent (___%) to cover overhead and profit.

Trades Included. (Bidder to fill in) The trade or trades included in this proposal, the names of proposed subcontractors, and the amount included for each part of the work follows:

Part of Work	Proposed Subcontractor	Amount
		$
		$
		$
		$
		$
		$
		$
		$
		$
		$
		$
		$
		$
		$

Bulletins. (If bulletins covering addenda to the plans and/or specifications have been received during the bidding period, the bidder shall insert numbers and dates below.)

The work described in the following bulletins is included in this proposal:

Bulletin No._____ Dated _____
Bulletin No._____ Dated _____
Bulletin No._____ Dated _____
Bulletin No._____ Dated _____

Proposal Acceptance. The undersigned bidder agrees to execute a contract for the work covered by this proposal, provided that he be notified of such acceptance within_____ days of the time set for the receipt of proposals.

_____
(Name of Contractor)
By: _____

of invitation should be sent to those bidders. This letter should give the location of the job, dimensions of the buildings, a brief description of the construction, the desired timetable for completion, the deadline for answering the invitation, and any other pertinent data. See Fig. 5 for a sample "invitation to bid" letter for a mill-type building.

Now, assume the replies from the invited bidders are in. The plans and specifications are completed, checked, and reproduced for distribution. The next order of business is to send out for bids.

Procedure for lining up and receiving proposals will vary with architects and owners. Generally, most will send an "instruction to bidders" letter along with the plans and specifications. This letter should be complete in instructions, information, requests, and data to enable all bidders to bid on the same basis.

Many times the owner desires to have alternate bids on certain items, wants overhead and profit percentages for extra work, desires a breakdown of the lump sum price for depreciation and accounting purposes, requests unit prices to cover extra work or deductions for omitted work, etc. All such pertinent information should be included in the "instruction to bidders" letter, which is forwarded to the bidders with the plans and specifications. A typical form for such a letter is outlined in Fig. 6.

If the owner desires numerous substitution and alternate bids, several costs for accounting purposes, a list of subcontractors and suppliers, and other data, then an "instruction to bidders" letter would be too long; and a "Form of Proposal" should be substituted. Such form, depending on the data requested, may run five to ten pages long. Filling in of such identical forms by all bidders better assures bids which will cover the same work. This "Form of Proposal," in triplicate, should be sent to all bidders, along with an "instruction to bidders" letter which only includes information not included in the "Form of Proposal," and with a request that two copies, after fill-in, be returned to the owner, one copy to be retained by the bidder. See Fig. 7 for a proposed "Form of Proposal."

During the bid period some of the contractors' estimators will call the architects or you for information and clarification. If it is of minor importance, a phone call to estimators other than the one who called will give all of them equal data. If the point is of major importance and should be a matter of record, then a bulletin should be issued to all bidders. If several items have come up, these can be combined into one bulletin.

Let us assume that the job discussed herein was designed for oil-fired heating boilers and that, two days after the plans went out, the gas company notified you that gas was available on your recent application for space heating your plant. You have decided to substitute gas for oil fuel, and your engineers have completed a drawing and written the paragraphs of the specifications to cover a complete gas installation. Figure 8 outlines a form of "bulletin" which has been filled in to cover the change from oil to gas fuel. This is a form similar to one used by a large architectural firm.

Basic information and the general set-up will be the same for all bulletins; the body will vary to suit end result to be obtained. Bulletins should be numbered consecutively from "1," up; dated; show job number, if any; identify the job, the owner, and the location; have space for approval for the owner; identify the contract involved; and give a very brief title to the change. The body of the bulletin should be edited very much like the specifications, with subheadings, paragraph numbers, etc.

You are now ready for the arrival of the day which is the deadline for the receipt of all of the bids. **End Part III**

Watch for Parts IV and V. Part IV covers analysis of bids, agreement forms, and signing the contract. Part V discusses the problems that arise in the field during the construction period; progress reports, final inspection and approval of completed work.

Fig. 8. This is a sample form of "bulletin" sent to all bidders when a major change in specs is contemplated. This particular bulletin covers change from oil to gas for fuel.

ARCHITECTS & ENGINEERS, INC.
1 Washington Street
Somewhere, Illinois

BUILDING Office and Plant
OWNER A. B. C. and Associates
LOCATION Somewhere, Illinois

BULLETIN NO. 2
DATE 5-15-55
PAGE 1 of 8 pages
JOB NO. 10-100
APPROVED FOR OWNER
BY: John Doe

This is a Supplementing Bulletin—This is NOT an order
General contract
Change in Type of Heating Fuel

INTENT

1. This bulletin is issued **prior to award of contract** to change the plans and specifications to cover the use of city gas fuel, instead of the oil fuel now specified and designed for.

2. Unless otherwise specified herein or shown on drawings accompanying this bulletin, work which is required by this bulletin shall be in accordance with contract documents or previously or subsequently issued bulletins.

3. Contractor shall adjust estimates covering work of other trades as required to conform to the changes, omissions, and additions covered herein.

4. Contractor shall definitely state in his proposal that items herein have been taken care of in his estimates and are included in the proposal.

OMISSIONS

5. Omit from estimate all work shown on heating drawings with reference to oil burners, oil tanks, oil piping, appurtenances and accessories herewith, and installation thereof, etc.

6. Omit from estimate all work covered by Paragraphs 82 to 85, inc.; 90 to 107, inc.; 113 and 114; and any other paragraphs or parts of paragraphs of Section "K" which have to do with oil fuel installation or use.

ADDITIONS

7. Add to the estimate all work shown on the accompanying drawing No. B-1000-M2X with reference to city gas line from the main in the street to the meter, the meter, the burner, and all piping required therewith.

8. Add to the estimate all work covered in the following paragraphs as it supplements or adds to the work outlined on the above mentioned drawing.

Outline in subheaded, numbered paragraphs, in specification form, all information required to properly install equipment for city gas firing.)

**Get These for Your Files—
There's No Charge—
But Request Must Be Made
On Your Company Letterhead**

A 16-page copy of section A, "General Conditions," applicable to all contracts, large or small, is available without cost to you. This section, the result of years of experience, gives the exact wording of each paragraph to help convey the intent of your planned work and to properly protect your company.

Also, full size reproductions of the bulletins shown in Figs. 1, 2, 3 and 4, covering changes in specifications or plans, contract change order forms, useful index, and a page from a typical trade specification will be sent to you upon request. **Request must be made on your company letterhead addressed to The Editor, Plant Engineering, 308 E. James St., Barrington, Ill.; all other requests will not be honored.**

Fig. 1. Plant Engineers from Atlanta, Georgia, and surrounding cities attended the initial meeting on August 27 to organize the Atlanta Chapter. G. Chapman and R. Crawford will serve as temporary chairman and secretary.

AIPE ORGANIZES NEW CHAPTERS

Members Take Active Part in Conferences

PLANT ENGINEERS in three different areas recently held organizational meetings to discuss the formation of a chapter and affiliation with the American Institute of Plant Engineers.

The first group was in the Fox Valley area. Their initial meeting was on June 20. Membership for this chapter is from plant engineers in the Aurora-Elgin, Illinois area.

Don Wangelin of the Research and Development Laboratory of Pure Oil Company of Crystal Lake, was named chairman of the new group. Otto Bombach, of All Steel Equipment Company, will serve as secretary. Members of the Constitution and By-Laws Committee are: F. G. Peaslee of Shakeproof Division, Illinois Tool Works; R. C. Peck of Western Electric Company; and O. Bombach.

Fig. 2. On August 21 another organizational meeting was held in Morton Grove, Illinois, to found the Skokie Valley Chapter of the AIPE. Plant Engineers from Skokie, Morton Grove and other northwest suburbs of Chicago attended.

Another organizational meeting was held on August 21 in Morton Grove, Illinois, to found the Skokie Valley Chapter of the AIPE. Plant engineers from Skokie, Morton Grove and other northwest suburbs of Chicago form this group.

Art Gregersen of Crane Packing Company was named temporary president, with W. H. MacCorquodale, of Janette Electric Manufacturing Company, acting as secretary. C. E. Burns, of A. B. Dick Company and L. E. Plassmeyer, Phillips Manufacturing Company, will serve as advisors.

People taking part in this meeting, and appearing in the photograph, Fig. 2, are:

Standing, left to right: K. Dopp, Bell & Gossett Co.; H. J. Marks, Sunbeam Corp.; H. T. Johnson,

Fig. 3. Fox Valley organizational meeting was attended by, standing, left to right: R. F. McCaw, Technical Publishing Co.; C. Swikert, All Steel Equipment Co.; D. J. Cork, W. R. Meadows, Inc.; F. G. Peaslee, Shakeproof Div., Illinois Tool Works; Kay Buchanan, national headquarters, AIPE; T. Smith, Jewel Tea Co.; F. Schneider, The Quaker Oats Co. Research Lab.; R. C. Peck, Western Electric Co. Seated, left to right: B. Poest, Austin-Western Construction Equipment Co., Baldwin-Lima-Hamilton Corp.; D. Wangelin, The Pure Oil Co., Research Center; O. Bombach, All Steel Equipment Co.; and J. E. Wichman, Sr., Jewel Tea Co. Initial meeting was held on June 20.

Fig. 4. Speakers at the Purdue Center Seminar were, left to right: O. Seidl, Combustion Engineering, Inc., Calumet Chapter; W. A. Perry, Inland Steel Co.; R. H. Morris, Editorial Director, Plant Engineering, and a past president, AIPE; M. O'Hern, American Steel Foundries, Calumet Chapter; and P. Janney, Federated Metals, Div. of American Smelting and Refining Co., Calumet Chapter.

Fig. 5. Members from various chapters participated in the Plant Engineering Session of the SAE National Farm, Construction and Industrial Machinery Meeting. They are, left to right: B. J. Robichaud, The Toni Co., president Twin Cities Chapter; W. C. Wallin, Western Electric Co., AIPE regional vice president; S. A. Simonson, Chicago Hardware Foundry Co., AIPE president; J. N. Jacques, Lakeside Laboratories, past president of Milwaukee Chapter; K. N. Banthin, Visking Co., Div. of Union Carbide Corp., AIPE treasurer; and O. Seidl, Combustion Engineering, Inc., Calumet Chapter. Simonson served as chairman.

Avon Products, Inc.; L. E. Plassmeyer, Phillips Manufacturing Co.; W. Marsh, Baxter Laboratories, Inc.; R. Schiller, Powers Regulator Co.; and J. E. Terras, Bell & Howell Co.

Seated, left to right: W. H. MacCorquodale, Janette Electric Manufacturing Co.; A. R. Gregersen, Crane Packing Co.; C. E. Burns, A. B. Dick Co.; Kay Buchanan (assistant secretary, AIPE); S. A. Simonson, Chicago Hardware Foundry Co. (President, AIPE); and R. L. Dickson of Plant Engineering magazine.

The most recent group to organize was the Atlanta (Georgia) Chapter of the AIPE. Their initial meeting was held at the Carling Brewing Company on August 27.

W. C. Wallin, regional vice president of the AIPE and chief of the plant engineering department for Western Electric Co. in Winston-Salem, N. C., was in charge of the organizational meeting.

G. E. Chapman, plant engineer of Westinghouse Corp., Athens, Ga., was named temporary chairman, and R. L. Crawford, plant engineer for Fulton Bag and Cotton Mills, Atlanta, was named temporary secretary. Constitution and nominating committees were also established.

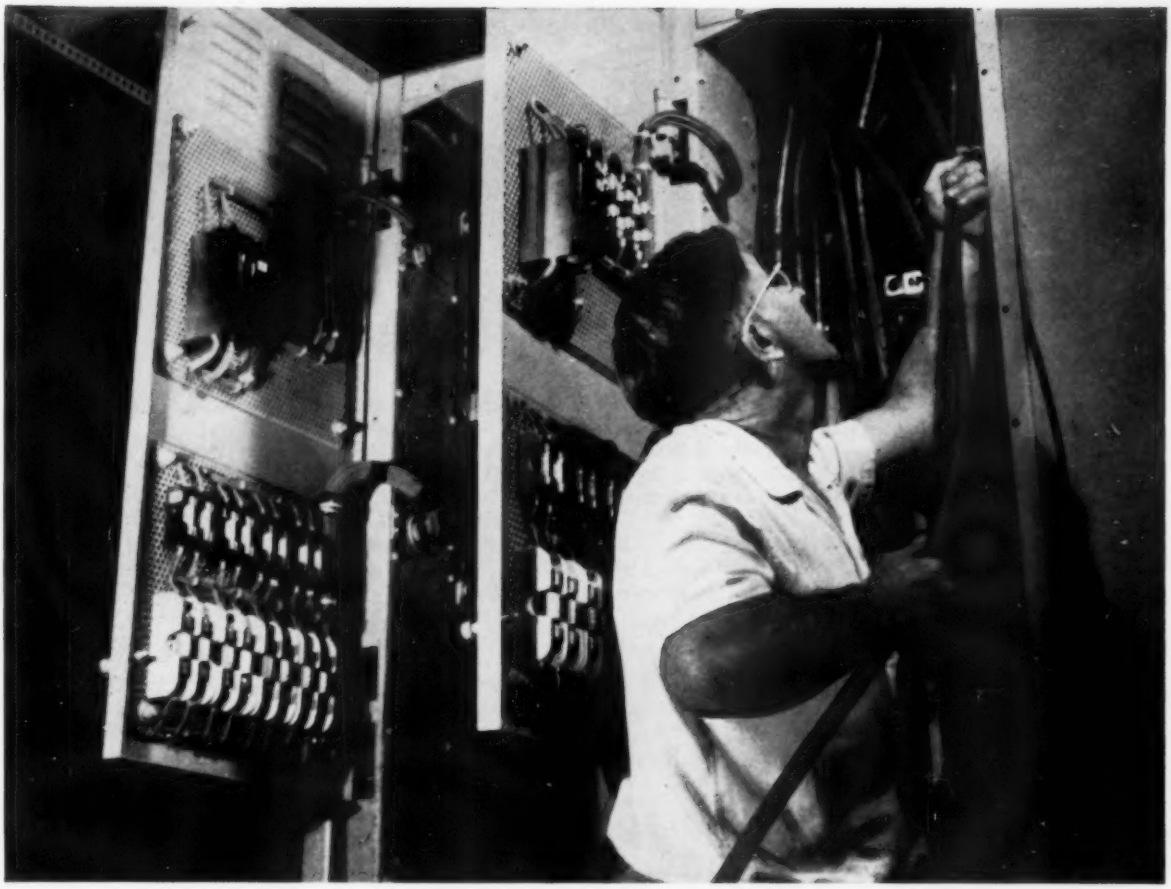
People attending this meeting, and appearing in the photograph, Fig. 1, are:

Standing, left to right: D. R. Rose, Owens-Illinois Glass Co.; T. H. Power, Carling Brewing Co.; R. L. Millspaugh, Owens-Illinois Glass Co.; H. Voss, National Biscuit Co.; O. L. Sumner, General Shoe Corp.; G. E. Chapman, Westinghouse Corp.; E. J. Docekal, Lockheed Aircraft Corp.; V. Kempf, electrical editor, Plant Engineering magazine; R. L. Crawford, Fulton Bag and Cotton Mills; L. O. Lemon and W. C. Wallin, of Western Electric Co.

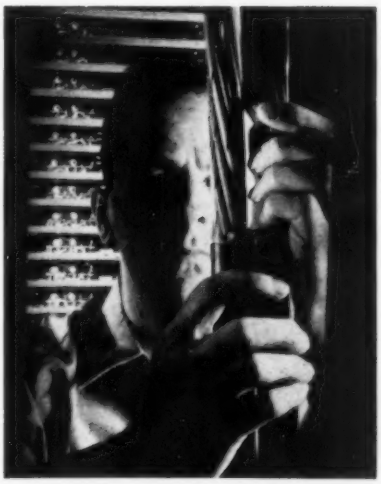
Seated, left to right: M. B. Renner, Carling Brewing Co.; R. E. Rowe, Tennessee Corp.; W. A. Kemmer, Buick-Oldsmobile-Pontiac; H. C. Waggoner, Jr., H. W. Lay and Co., Inc.; and J. H. Blum, Owens-Illinois Glass Co.

In addition to organizing new chapters throughout the country, the AIPE has participated in sev-

(Continued on page 208)



When control panel squeeze pinches your profits you need Rome's easy-to-install control cable



When you're in a tight spot—You can depend on Rome's "CT-2" control cable to take up much less space and let you make connections faster and easier.

Here's the way to speed up making complex control-panel connections in tight quarters. Install a control cable that's easy to work with—even in limited space requirements.

You'll find just such a cable is Rome's "CT-2" control cable. Its smaller diameter will fit even into those panels that are already "tight." It's lightweight, too, and easy to pull through conduit.

Faster installation . . . more profit

Don't spend unnecessary time laboring over connections in panels already packed with a lot of control cable. Because it's slim and trim, Rome's control cable lets you make these connections quickly and efficiently—*even* in those "tight spots." With Rome's Rolene insulation you get clean, positive stripping. And you can make sure and dependable terminations—for a more efficient installation. The Synthinol (PVC) sheath* has a smooth surface which makes it easy to handle when you feed it off the reel.

This ease of installation adds up to faster jobs and greater profits . . . each time you work in tight quarters (or anywhere else) with Rome's "CT-2" control cable.

Use Rome's control cable for your next job where you find a control panel squeeze. For more information, contact your nearest Rome Cable representative—or write to Department 854, Rome Cable Corporation, Rome, N. Y.

*Alternate sheaths of Rolene (polyethylene) or Roseal (flame-resistant polyethylene) are also available.

ROME CABLE

CORPORATION

For more facts circle 562 on Reply Card

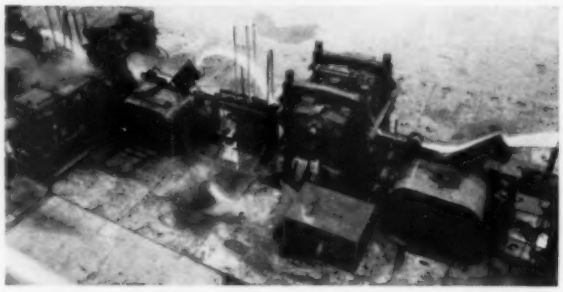
Hot Steel Gets Automatic Handling, Special Treatment in New Bar Mill

IN THEIR NEW BAR MILL at South Chicago, Republic Steel Corporation has incorporated several features that set this mill apart from others that have preceded it. Operations at the mill, which is almost automatic, consists of uniformly heating three- and four-inch square steel billets and then passing them through a series of rolling stands.

Among the special features of the mill are the use of vertical looping, alternate horizontal and vertical rolling, and straightaway operation.

Vertical looping "takes up the slack" in the steel strip as the speeds of the various roll stands are synchronized. Since the speed of the steel leaving one stand is greater than the speed at which it can enter the following stand, it has to be slowed or looped to keep it from piling up between stands. At the new mill, it is looped vertically.

Alternate horizontal and vertical rolling makes it possible to work all sides of the steel without having to twist or turn it between roll stands. The working is therefore accomplished without deforming the bar.



Straightaway operation simplifies the rolling process, because the steel is always moving in the same direction during its trip through the quarter-mile-long mill.

Maximum delivery speed of the mill is 3000 feet of finished product per minute, or approximately 35 miles per hour. The heating furnace, in which the billets are brought up to rolling temperature, can provide sufficient steel to produce 85 tons of finished product per hour.

Aluminum Building Designed To Fit the Storage Pile It Covers

MAINTENANCE-SAVING ADVANTAGES of aluminum siding and roofing are being demonstrated on one of the largest raw material storage buildings in the country, at Kaiser Aluminum & Chemical Corporation's Gramercy, La., plant.

Designed by Kaiser engineers for storage of moist bauxite, the building has semi-circular ends and sloped sides and roof to conform to the shape of the storage pile. These provisions for maximum use of space make it possible to store 132,000 long tons of wet bauxite ore.

It was an ideal application for aluminum, with its inherent resistance to corrosion, since the need for costly initial and maintenance painting is eliminated. Other maintenance-reducing provisions included elimination of light trusswork and laced members from the structural frame, and the reduction of stiffeners on main members.

Main structural frames in the building each consist of three hinged arches of built-up plate girders, 204 ft in span and spaced 25 ft on centers. Weight of the structure per square foot of building is approximately 13.5 pounds.

Ore is delivered to the top of the building by a 54-in.-wide conveyor and is dumped on the pile by a remotely-controlled shuttle conveyor located at the roof ridge and running the length of the building. Recovery is made through two reclaim tunnels.

Heat Pump Uses Below Freezing Air To Heat Laboratory

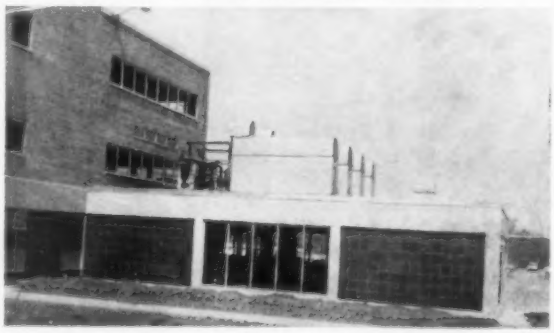
INDUSTRIAL HEATING AND COOLING has passed another "first," at the Sylvania Electric Product Company's Amherst Engineering Laboratory in Buffalo, N. Y.

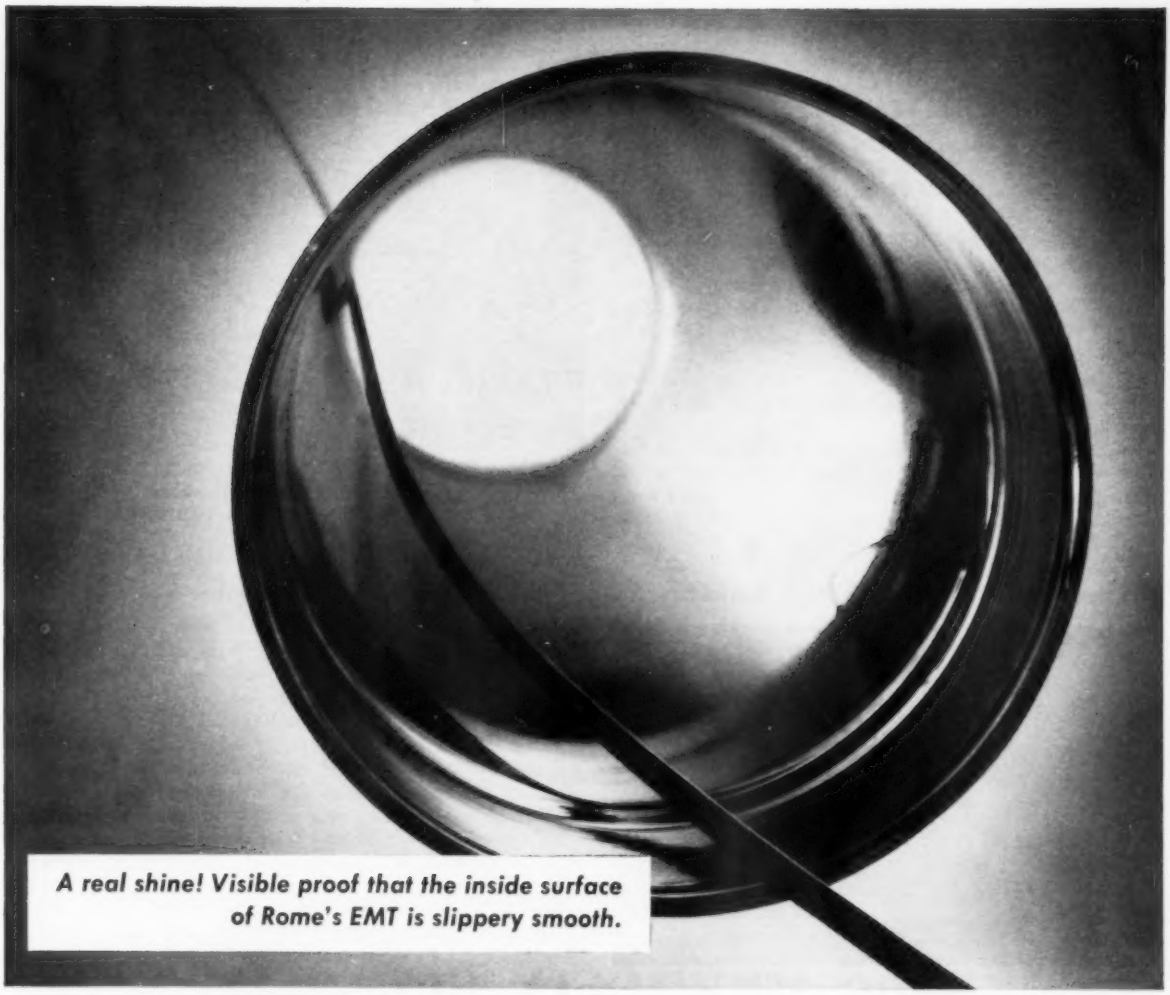
The laboratory, which does advanced electronic development work, will be heated and cooled by a compound compression air source heat pump developed by the York Corporation subsidiary of Borg-Warner.

Using only the electricity needed to run the equipment, the system extracts heat from the outside air, even in below zero weather. The heat removed from the outside air is raised to a usable temperature level by refrigeration compression. This heat is used to produce hot water which is circulated to air conditioning apparatus throughout the building.

The same refrigeration equipment that cools the building during the hot summer months will therefore heat the 85,000-sq ft structure during winter weather.

The entire system is automatically controlled by a Minneapolis-Honeywell data center and control system which actuates valves for heating or cooling.





A real shine! Visible proof that the inside surface of Rome's EMT is slippery smooth.

"Tape's eye view" shows why Rome's EMT is easiest to fish

That shine you see is the reason fish tape won't "hang up" when you use Rome's EMT.

The slick interior finish of Rome's EMT lets your fish tape slide through with an absolute minimum of resistance. Careful baking—under rigid control—produces a uniformly smooth enamel-like finish inside Rome's EMT.

In a test conducted by the Anstice Company, a completely unbiased party, Rome's EMT came out first in fishability. Three ten-foot lengths of ½" EMT, Rome's and two competitive samples, were formed into identical figures containing eight bends. The ⅛" fish tape used in the test easily passed through the eight bends in Rome's EMT, but "hung up" on one of the bends in both competitive samples.

Strong weld In another test to determine the strength of the weld on Rome's EMT, a sample was squeezed, flared, flattened, and expanded. In each case, the weld proved to be as strong as the metal itself.

Easy bending The strength of Rome's EMT interferes in no way with its ductility. You can make bends—even intricate ones—quickly and easily.

Corrosion resistance A uniformly electrogalvanized exterior finish protects your installation against corrosion. Long dependable service life is assured.

Use easy-fishing, easy-bending Rome EMT on your next job. Contact your nearest Rome Cable representative for more information—or write to Department 905, Rome Cable Corporation, Torrance, California.

ROME CABLE

CORPORATION

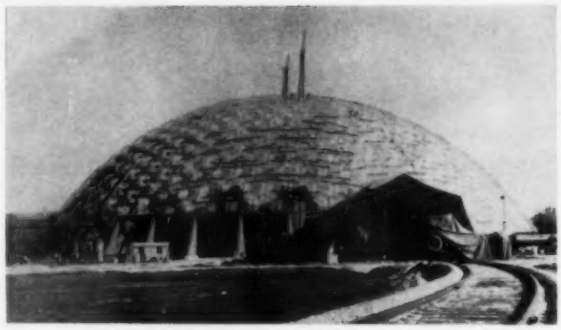
For more facts circle 563 on Reply Card

Circular Building To House Tank Car Maintenance Facilities

THE WORLD'S LARGEST circular building—Union Tank Car Company's Union Dome nearing completion at Baton Rouge, La.,—is 384 ft in diameter and approximately 10 stories high. The dome consists of 321 hexagonal steel panels welded together and strengthened by external supporting tension and compression members. The total exterior panel surface is 154,900 sq ft.

This, the first major industrial use of a geodesic dome, will serve as a regional tank car repair and maintenance plant for Union Tank. The dome has no internal supports whatsoever, thus permitting complete flexibility in interior layout and in movement of men, equipment and materials.

A smaller geodesic dome, within the large one, will be used as office area in the repair center. A tunnel, leading into the main dome, will serve as a paint area for tank cars. The tunnel itself will be 200 ft long, 40 ft wide and 20 ft high.



The building, which will be in full operation in October, will be painted bright yellow, with its external structural supports a royal blue.

Railroad Uses Largest Butler Building As Freight Handling Warehouse

A BUILDING that covers more than eight acres and is one quarter of a mile long has been put into service by the Burlington Railroad. Designed to speed handling of less-than-carload shipments, the 280-ft by 1240-ft Butler building is located in the Burlington's Cicero, Illinois automa ic classificatien yard.

E ght tracks, capable of accommodating 184 freight cars, run the full length of the building, which has 205 loading bays. Actually, both sidewalls of the building consist of solid rows of overhead doors—each sheltered by a canopy to facilitate all-weather handling of freight.

Light green plastic panels were inserted in the roof panelling at regular intervals, to supplement artificial lighting and eliminate the contrast of dark areas overhead and light areas at working level.

Foam-Blanketing System Protects Chemical Plant From Hazards of Benzol Production

INSTALLATION of a special hazards foam system at the benzol plant of Pittsburgh Coke & Chemical Co., is giving the company zoned fire protection in a critical area of their Neville Island, Pa., plant. Engineered and installed by Blaw-Knox Co., the foam system covers processing equipment and storage tanks occupying more than an acre.

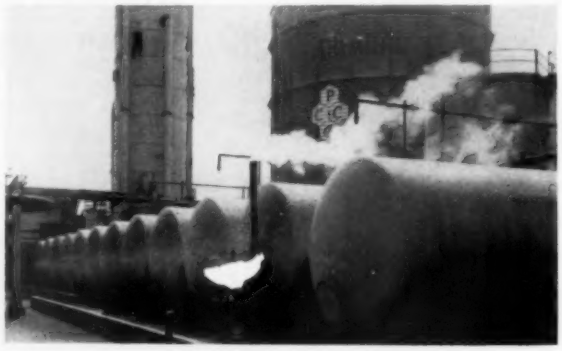
The installation includes five individual systems subject to manual control from the foam house, and a hydrant system with six foam hydrants located throughout the area. At these points, hose and playpipe may be attached to apply foam manually to areas not within range of the fixed nozzle system.

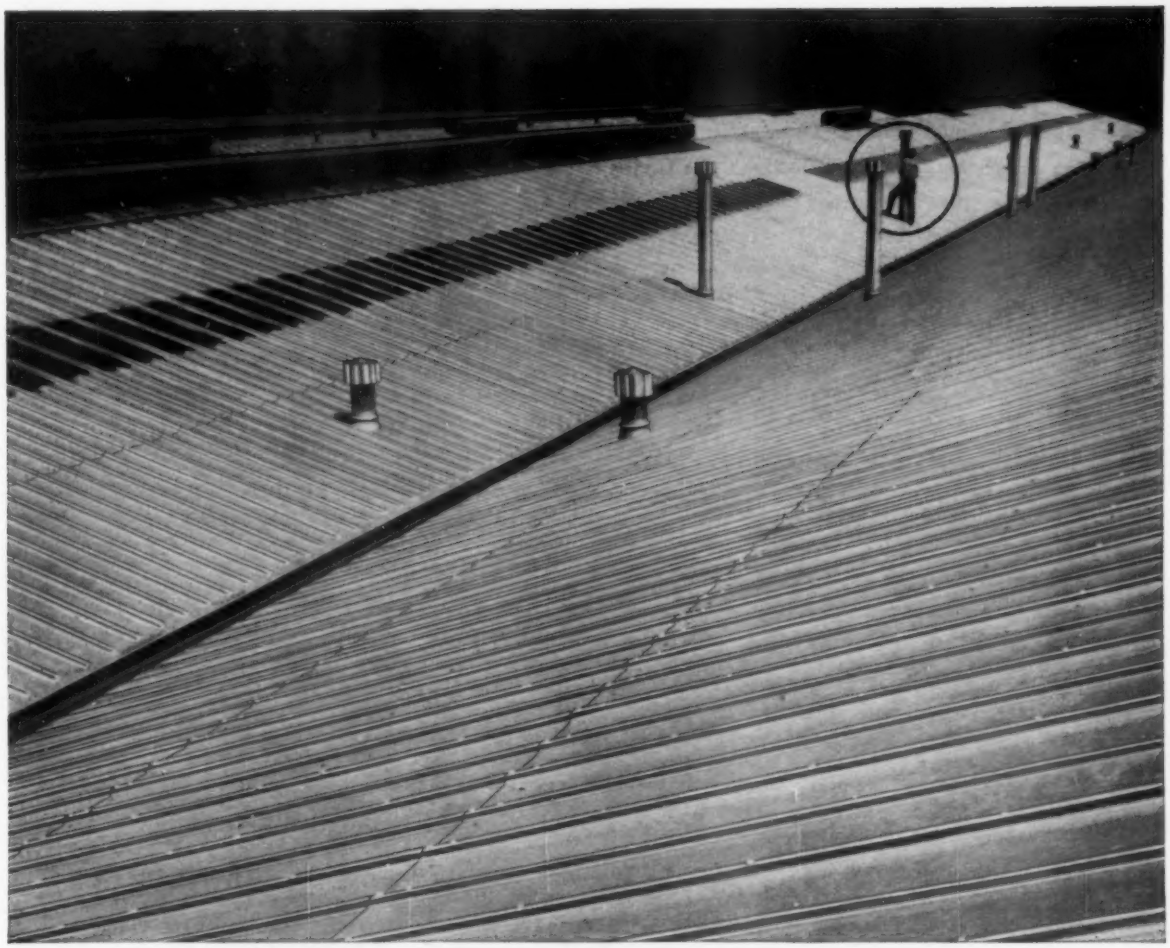
Sixty-six foam-making spray head units, two tank side foam makers, and three 2½-in. playpipes are included. There are about 1600 ft of underground pipe and 2200 ft of above ground pipe.

The system was designed to provide at least 50 psi water pressure at any foam-making unit. It protects at one time an area which contains 16 horizontal tanks, 10 ft in diameter and 24 ft long, mounted in a dyked area 50 ft by 150 ft, plus an additional 25-ft-square area containing one horizontal tank. The tanks range in capacity from 20,000 to 50,000 gal.

The area requires a water flow rate of 1280 gpm, intermixed with 38 gal of foam compound per minute. To provide enough foam compound to supply this area, 1735 gal of compound had to be stored. Nearly 500,000 gal of actual foam blanket can be produced from this quantity of compound. This quantity of foam would cover 120,000 sq ft of level surface with a foam blanket six inches deep.

The foam compound, stored in a 2000-gal tank located inside a concrete block foam house, is drawn from the tank by an electrically-operated 40 gpm pump. Through a system of orifice plates and manually-operated valves, the proper amount of compound can be introduced into the water stream being directed to any particular area of the plant, to produce fire-killing foam.





FIVE-ACRE ALUMINUM ROOF YIELDS BIG MAINTENANCE SAVINGS

Butler Manufacturing Company builds for AMF with Alcoa Aluminum

To eliminate expensive yearly maintenance and repair, one of American Machine and Foundry Company's newest plants is completely roofed with corrosion-resistant Alcoa® Aluminum. The entire facility, built in conjunction with the Arkansas Industrial Development Committee, houses AMF's bicycle manufacturing operation.

This Butler High Rib Roof Panel of Alcoa Aluminum also reflects the sun's heat to keep the interior as much as 15 per cent cooler in the summer. Aluminum's heat reflecting characteristics help reduce air-conditioning loads as well as heating costs. Lightweight, easy-to-work-with aluminum goes up faster with less man power and requires less expensive frames and foundations.

Get Complete Facts on aluminum roofing and siding materials and their application to industrial buildings, warehouses, laboratories and utility structures. Contact your nearest Alcoa sales office, or write Aluminum Company of America, 858-K Alcoa Building, Pittsburgh 19, Pennsylvania.

Building:
American Machine and Foundry Company, Cycle Division, Little Rock, Ark.

Engineers and Builders:
Butler Manufacturing Company, Kansas City, Mo.

ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA

Your Guide to the Best in Aluminum Value

ALCOA THEATRE
Fine Entertainment
Alternate Monday Evenings

For more facts circle 564 on Reply Card

NEW PRODUCTS AND PROCESSES summarized for your convenience

Edited by M. E. Heniken

1—SCHEDULING CHART shows past, future phases

Many scheduling problems can be solved with Rol-a-chart, a new concept in visual control boards. Entries are made directly on the rotating, transparent, plastic sleeve with a marking pencil and erased with

the wipe of a cloth. No typing, tabs or cards are needed. The continuous sleeve is moved across a fixed grid, so designed that time intervals from minutes to months can be set up. The board provides 8 sq ft of scheduling space, yet occupies only 4 sq ft of wall space. Time is visualized readily by moving the sleeve forward or backward to check any phase of scheduling, past or future. Built of steel, the Rol-a-chart is equipped with wall hangers, folding easel and carrying handle. Red and black marking pencils are furnished with it. Conley, Baltzer & Steward.

2—CENTRIFUGAL PUMPS, oil or grease lubricated

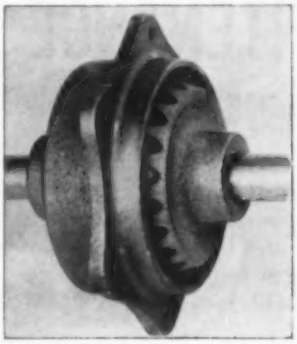
Availability of this company's most popular line of single-stage, double-suction centrifugal pumps with ring oil bearings as well as grease lubricated bearings is announced. The pumps are Fig. 3405 (grease lubricated) or Fig. 3406 (oil lubricated) in 33 sizes with capacities from 200 to 6400 gpm, heads to 425 ft. Standardization and interchangeability of parts results in minimum requirements for spare parts inventory and gives flexibility for field changes to meet new requirements. For the entire line there are only three shaft and six rotating part assemblies exclusive of impellers and wearing rings. Mounting dimensions of all pumps within a group are identical. Motor drive bed plates are standardized to the degree that all bed plates for a particular pump have the same pump mounting dimensions and are jig drilled and tapped to accommodate all motor frames within the scope and size of the bed plate. Pumps are available bronze fitted, all iron, or all bronze; certain sizes may be had in steel and stainless steel. Goulds Pumps, Inc.

3—PH METER for fast and continuous service

This compact line-operated pH meter is an electronic unit measuring 5½ by 6¼ by 2 in. It is designed for accurate determination of pH in raw, untreated, treated, potable, cooling and waste waters, boiler condensates, feed waters, oil field blends and brines. An auxiliary pointer is provided to enable checking of standardization without buffer solutions between measurements. Meter is claimed to be ready for operation 3 min after being plugged into a 100-125 v, 50-60 ac circuit. The meter covers a broad range of pH with high sensitivity, manufacturer states, and color, turbidity or chlorine in test samples will not affect readings. Hagan Chemicals & Controls, Inc.

4—DIFFERENTIAL ASSEMBLY uses a single axle

For drives up to 6 hp, this differential assembly makes use of a single axle yet equalizes power to both wheels, permitting easy and shortened turning. It is designed for

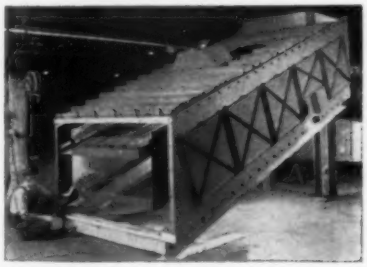


horizontal or vertical shaft engines, and may be used with either forward or reverse action. Measuring 5⅛ by 3⅜ in., it has a six-bolt flange on which may be mounted a sprocket of any size. Weight is 3½ lb. Axle bore may be from ½ to 1 in. Manufacturer claims the differential gives more positive drive with no slippage on the turns. Cizek Mfg. & Distributing Co.

It's easy to obtain product data with the postage-free Reader Service Cards provided on pages 211-212. Use them for information on advertised products, too. Just circle the key number appearing at bottom of the ad.

5—ENCLOSED SCREEN keeps plant areas cleaner

Model SH Ripl-Flo Screen, equipped with air springs, is a standard open type floor mounted screen with stationary frame enclosure, access side

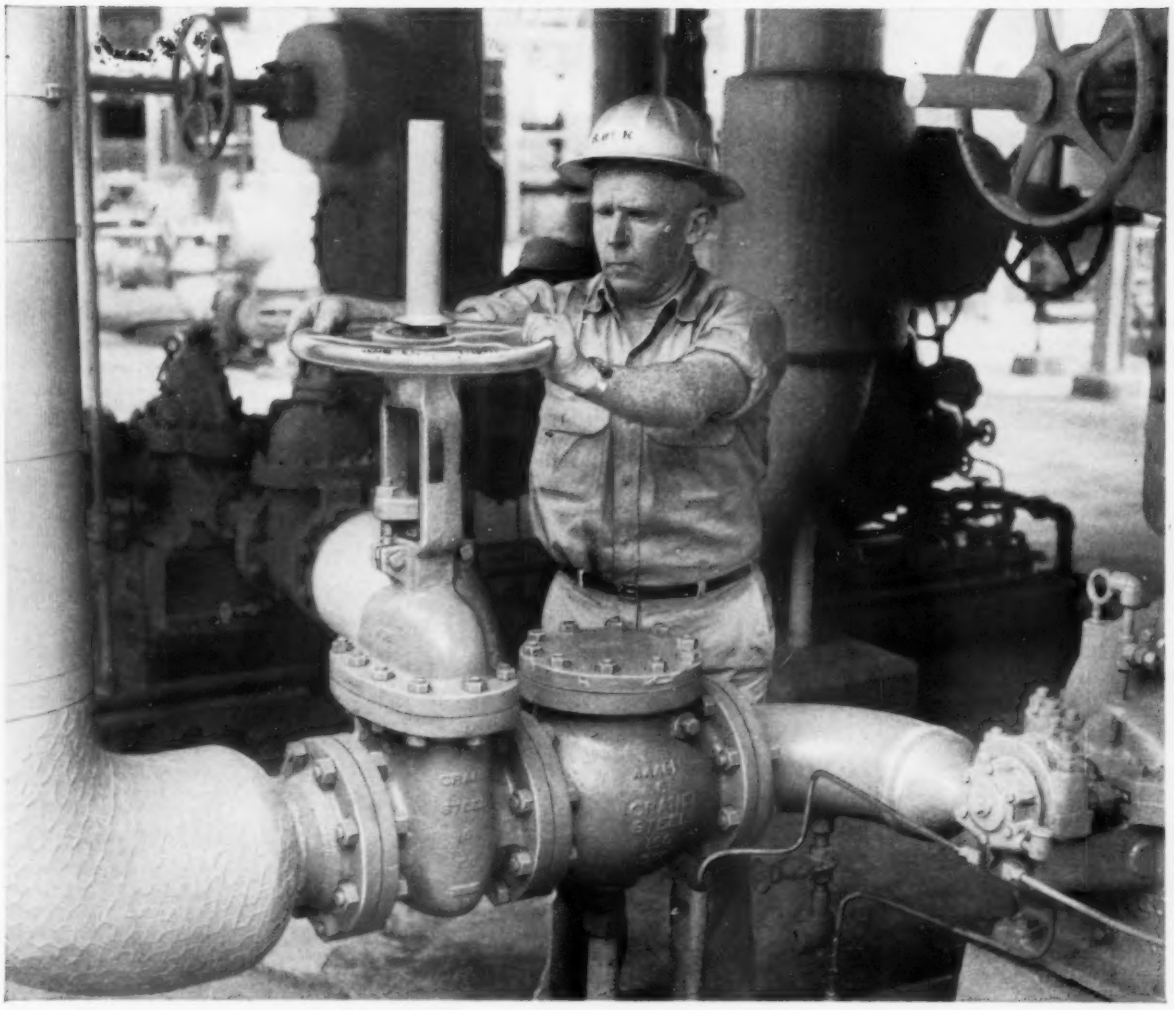


doors and top covers held in place with quick opening latches for easy access to all portions. Where desired, an exhauster outlet can be provided in the top of the enclosure. The enclosure is bolted to stationary discharge spouting. Provision can also be made for bolting a fines hopper to the stationary supporting frame for dust-free operation. Single- and double-deck screens of this type in 6-by-16 ft and 5-by-16 ft sizes are already being supplied to cement plants. Allis-Chalmers Mfg. Co.

6—GAS-FIRED UNIT pre-heats the make-up air

Designed to operate with natural, mixed, manufactured and propane gas, this air make-up unit is available in four unit arrangements in four sizes from 36 to 54 in. for various capacities, Btu ratings and pressure conditions. It is a self-contained package—only fuel and electrical connections are needed for operation. Direct-fired burner and premixer assembly serve to maintain correct air-fuel ratios at all firing rates, and to assure uniformity of temperatures and quick response to changes in air inlet temperatures. Fan, burner and shutter assembly

Gasoline Plant Cuts Valve Maintenance Costs



Crane Valves Do the Job After Others Fail

Six years ago this large gasoline plant in the Southwest, installed new gate and swing-check valves on hot water pump lines handling boiler make-up water.

Bonnet joint leaks and seat leakage developed after a short time. Maintenance costs jumped. After many attempts to stop the leakage, the bonnet joints were welded shut.

Two years ago the valves finally had to be replaced. Six-inch, 150-pound Crane steel gate and swing-check valves were installed. Today these Crane valves continue to operate without any leakage at bonnets or seats, and without a penny spent for maintenance.

Why are the Crane valves still operating *with* 100% efficiency and *without* maintenance? *It's Crane quality*—in design, materials and workmanship—that makes the difference!

For information about Crane steel valves for all services—power and process fluids handling—see your Crane Representative, or write to the address below.

IDEAS FOR YOU—This free book gives you 32 case histories of important savings with quality valves. Ask for "Valve Performance Facts."

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill.—Branches and Wholesalers Serving All Areas

For more facts circle 565 on Reply Card

NEW PRODUCTS

(Begins on page 138)

are automatically operated, and safety switches are provided to prevent premature firing and accumulations of combustible fumes and gases. Aerovent Fan Co., Inc.

7—BELT SANDER offers "no-dust" feature

For continuous, heavy-duty use, this 3-in. belt sander is announced as providing dustless sanding. It attaches to any vacuum cleaner to eliminate 90 per cent of the dust and fine metal powder. Besides affording longer belt life, with cleaner working conditions, this tool is reported to permit sanding in the same area where painting is being done. A timing-belt-drive provides quieter operation and requires no lubrication, it is noted, thus eliminating dripping grease on the work surface. Other features include a flush side to permit accurate sanding up to a vertical surface and an extended front pulley for work on contours. Black & Decker Mfg. Co.

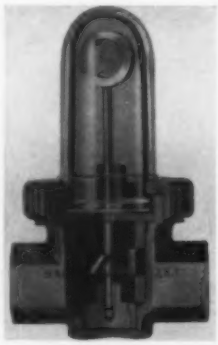
8—WARNING BEACON gives extra bright light

Model 271 Beacon Ray is a 360-deg revolving beacon claimed to produce the brightest of lights for emergency warning purposes. Mounting an intense, 200-w sealed beam lamp, this beacon produces 60 flashes per minute which carry over long distances both indoors and outdoors. It features a tilting beam, enabling the light to be angled upward to within 3 deg of vertical, or downward to just below the horizon. This tilting feature is designed to extend the beacon's effectiveness to locations where workers normally are above or below the range of most horizontal warning lights.

This light is suggested for use in high noise level areas where audible warning signals are not fully effective — as in foundries, steel mills, shipyards. It can also serve as a warning light for in-plant railroad systems. A heat-resistant, removable glass dome covers the lamp and comes in four colors or clear white. The dome is mounted on an enameled aluminum housing; moving parts are enclosed. Two models are available, one for surface mounting and one furnished with a ¼-in. pipe flange for stanchion mounting. Either model sells for under $90. Federal Sign and Signal Corp.

9—FLOW INDICATOR with adjustable range

Akron Variable Flow Indicators show at a glance whether flow is taking place. Claimed clearly visible from a distance, even in a bad light, a chromium plated ring spinning



under a glass dome has movement which precludes chance of misreading. It is reported useful wherever there is circulating water or oil. Specific applications include cooling water to air compressors, condensers, oil coolers; lubricating oil to bearings, gear trains; cooling oil to transformers, etc. Indicators can be reset in the field for high or low range and have die-cast brass body in ½- to 1-in. pipe sizes for flows from 0.72 to 24 gpm. Other models are available for flows from 0.075 to 120 gpm in pipe sizes to 3 in. McIntosh Equipment Corp.

10—LUBE KIT for routine rotary switch maintenance

This kit—about the size of a package of cigarettes—contains lubricants for routine maintenance of rotary stepping switches. In the carton are three 2-dram bottles. Removal of the carton top leaves the bottles upright, ready for use. Lubricants provided are those recommended by manufacturer for use in its industrial rotary stepping switches. They are:

How to "Turn on a Dime"

Today, production men must "turn on a dime" to meet changing output requirements. One day sales are off—machines are idle; the next equipment must produce at top speed to meet a rush order. This requires unusual flexibility in both men and machinery.

To help solve this problem, General Electric offers a new, packaged, adjustable-speed drive—the Speed Variator. Offering wide speed ranges and good regulation, it can help your machines produce a greater variety of goods, faster and at lower cost per unit.

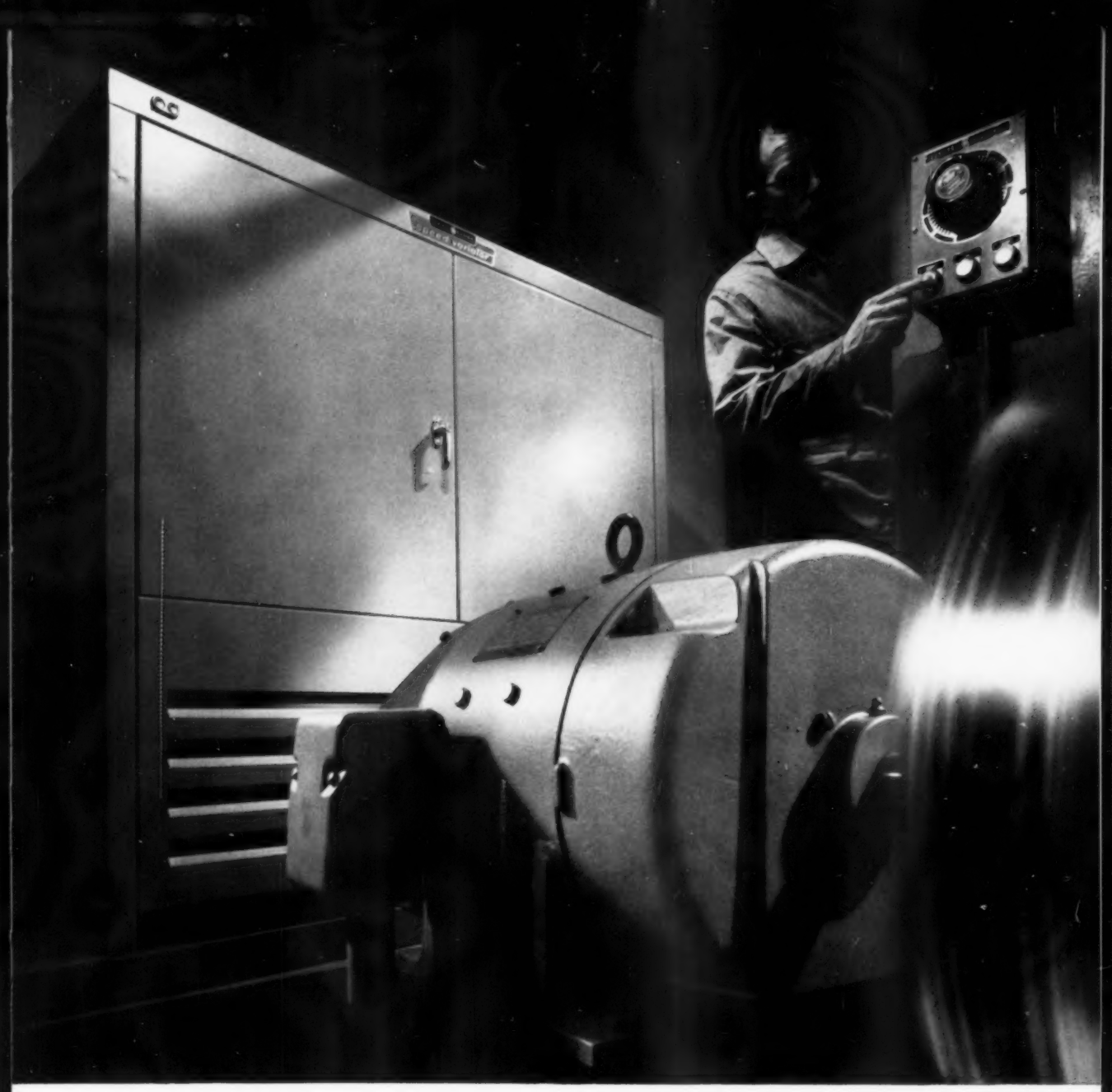
Find out how this versatile new drive can help you keep pace with today's fast changing production demands. Write for GEA-6643. *Direct Current Motor and Generator Department, Erie, Pennsylvania.*

813-20A

Progress Is Our Most Important Product

GENERAL ELECTRIC

For more facts circle 566 on Reply Card



5 REASONS WHY YOU SHOULD BUY—

New General Electric Speed Variator

1. Amplistat Regulator offers better speed regulation and adjustable, timed acceleration for improved product quality.

2. Static Exciter, with silicon rectifier, has no moving parts, requires no warm-up, provides more production time, less maintenance.

3. Two-Unit, Four-Bearing M-G Set features Tri-Clad† '55' motor for more dependable performance.

4. Front-Connected Controls, recessed wiring troughs make routine inspection easy, cut maintenance time.

5. Kinamatic* Drive-Motors have field coils encapsulated for longer life. For details on this dependable motor see next page.

For more information contact your Apparatus Sales Office or write for GEA-6643. *Direct Current Motor & Generator Department, Erie, Pennsylvania.*

In Canada, contact Canadian General Electric, Peterborough, Ontario.

* *Registered Trade Mark General Electric Co.*
† *Trade-Mark of the General Electric Co.* 813-12

GENERAL ELECTRIC

More On Kinamatic Motors

NEW GENERAL ELECTRIC DC MOTOR HAS

Coils Encapsulated for Longer Life

KINAMATIC* . . . *a new standard in industrial direct-current motors* . . . designed to give extra dependability to automated production systems.

Encapsulated Field Coils . . . insulated with mica and glass and permanently sealed against moisture and corrosive airborne materials . . . virtually eliminates insulation as an element in motor life and adds a reliability factor never before available in a standard direct-current motor.

Greater Versatility . . . a 15% service factor now available in the standard, dripproof d-c Kinamatic motor means user can: 1) obtain 15% more than rated power for normal life of motor; 2) obtain 100% longer motor life at rated power; or, 3) obtain greater versatility on speed and horsepower duty cycles.

Additional information is available at your nearest General Electric Apparatus Sales Office. Or, write for Bulletin GEA-6355. *Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.*

*Trade-Mark of General Electric Company. 813-12

Progress Is Our Most Important Product

GENERAL ELECTRIC

NEW PRODUCTS

(Begins on page 138)

blended lubricating oil (Spec. 5684), essentially a mineral oil blended with an oil having a paraffin base; watch oil (Spec. 5228), a refined grade of selected sperm or fish oil; and graphite-oil lubricant (Spec. 5232—Grade C) consisting of a blended lubricating oil and deflocculated graphite. The kit costs under $3.00. Automatic Electric Co.

11—TRAPPING UNIT simplifies installation

The Piping King is described as a valve combination assembly for use where by-pass piping is required for steam trapping. This assembly is designed to perform the functions of steam trap, strainer, air vent, check

valve, shut-off valves, test and blow down plug. According to manufacturer, installation involves only two joints and a half hour's time. The Piping King is installed as a unit in all positions and is claimed freeze-proof in vertical position. Major components in the assembly are company's forged steel universal steam trap and bonnetless valves. Velan Steam Specialties Inc.

12—SNAP-ON INSULATION is crushproof and light

Low K factor, excellent resistance to physical damage and to chemicals and solvents are claimed for snap-on urethane insulation. Based on Nacconate diisocyanates, this insulation is designed for service between –200 F to 250 F. It is suggested for refrigeration work and low pressure (5 psig) steam lines. It is pointed out that urethane insulation does not fray, crumble or break in handling—or disintegrate when subjected to water or many liquids. It is preformed to fit pipelines and fittings. The outside diameter is such that it will nest with a second layer, in case heavier thicknesses are desired. The dual-layer procedure also permits staggering of joints to reduce heat loss. Only one seam is required for the urethane foam insulation. It

deforms to be slipped over pipes and fittings, then snaps back to its original shape. It normally comes with a factory-applied moisture vapor barrier, but may be supplied with a felt paper jacket for outdoor use. It comes in preformed sections or flat blankets. Allied Chemical Corp.

13—BACTERIAL INHIBITOR for use in oil emulsions

Elcide 75 is announced as a bacterial inhibitor that will extend the life of soluble oil emulsions two to four times or more. According to manufacturer, Elcide 75 is a unique and stable combination of thimerosal and sodium-o-phenylphenate, effective in standard duty soluble oil emulsions. Studies are also reported to indicate effectiveness in protecting synthetic coolants. It is supplied as a brown aqueous solution and is readily dispersible in emulsions. Recommended concentration is 1 oz of Elcide 75 in 4 gal of fresh emulsion. Eli Lilly and Co.

14—AIR CONDITIONER has automatic filter section

Incorporated in this new line of Herman Nelson Multi-Zone Air Conditioning Units is manufacturer's Roll-O-Vent automatic filter section. Roll-O-Vent is said to add efficiency to any installation because it assures constant air delivery at all times and makes filter changing automatic. This compact central station unit is of sectionalized construction and claimed to maintain design conditions under varying loads in each zone of the system to be air conditioned. Eight sizes have air capacities ranging from 3400 to 36,000 cfm. Coils can be furnished for direct expansion, chilled water, steam or hot water. One cooling coil and one heating coil in each unit supply cooled, tempered or dehumidified air. Bulletin 870 gives details. American Air Filter Co., Inc.

15—SOLDERING ROD for aluminum joining, filling

Airco 720 Al-Solder Rod is an alloy specifically designed for soldering aluminum easily, efficiently and economically. It is announced as providing good color match and being clean to use, requiring no flux, no washing and no wire brushing. Precleaning and post-cleaning are unnecessary, company states. The rod is claimed particularly applicable for filling porous aluminum castings, for joining aluminum air ducts, aluminum foil and aluminum tubing, and for soldering galvanized sheets. This solder is applied by rubbing across joints which have been heated. Flame is not directed on the rod. Melting and wetting takes place at 400 to 500 deg below melting point of the aluminum at 720 F. Air Reduction Sales Co.

16—PUMP lubricates the bearings at work

The Automated Ram-Pump is designed to provide automatic or semi-automatic lubrication of bearings on single machine units while they operate. Air-operated and controlled electrically, mechanically or manually, the Ram-Pump is reported to provide the lowest cost centralized system available and one of the most effective. Two models are offered, one for low pressure applications of oil, the other for high pressure applications of grease or oil. Detailed information on this pump is provided in Bulletin 812. Lincoln Engineering Co.

17—HIGH PRESSURE LUBE comes in unique package

Molylube 110-L is an extreme pressure lubricant packaged in a self-contained polyethylene oil can, described as shatterproof and reusable. A solvent refined petroleum oil containing a stable dispersion of molybdenum disulfide, Molylube 110-L is formulated to impart a tough film capable of withstanding

NEW PRODUCTS

(Begins on page 138)

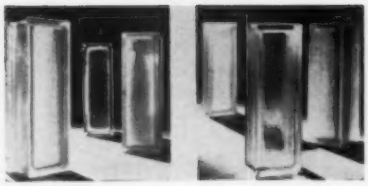
shock loads and wiping action. It displays high lubricity and polar affinity for metal surfaces greater than those displaced by regular mineral oils, according to manufacturer, and its high viscosity index assists in lubrication of bearing and machine parts at high temperatures. The compound is expected to find application — wherever a fluid-type extreme pressure lubricant may be desirable to prevent seizing and galling at bearing pressures over 100,000 psi. Bel-Ray Co., Inc.

18—BUS CONDUCTOR offers simple installation

Alcoa Universal Angle Bus Conductor is announced as a lower-cost substitute for smaller sizes of tubular bus conductor. This product, an L-shaped extrusion was developed to provide a bus conductor adaptable to normal cable lug connectors and it brings new features to an old conductor shape — the structural angle. Built in to it are shallow longitudinal grooves. On the outer surfaces of the bus, two ex-

truded grooves locate the center points for drilling holes which receive a standard connector, or for direct connection to station apparatus. On inner surfaces, a single groove locates the center line, so bus may be drilled to connect directly to insulators.

The new bus was designed primarily for use in distribution-type substations; it is also suggested for sub-transmission voltages, and for primary distribution voltages. Although used normally where current ratings are in the 700-800 amp range, UABC in the presently available 3¼-by-3¼-by-¼ in. size is rated 1300 amp. Where two such angles are used back-to-back, mounted directly to insulator caps and separated ¼ in., the resulting current rating is about 70 per cent higher than for single conductor. Length is 25 ft. Aluminum Co. of America.



19—GLASS BLOCKS in slim, rectangular shape

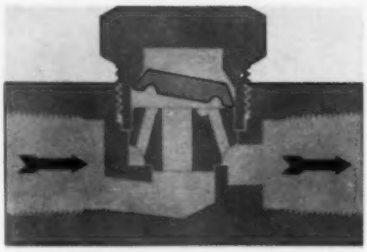
Glass blocks, 4 in. wide and 12 in. long, are introduced in a new design with an acid-etched appearance on the inner faces. Outer faces are smooth. Called the "4 by 12," this rectangular glass block is also available with a white fibrous glass screen in the center, which acts as an additional light diffuser and adds to the block's already good insulating value. It may also be had with the blue-green Suntrol fibrous glass diffusing screen to further reduce glare and instantaneous heat gain. Based on a 4-in. module, this new shape may be used alone, in combination with company's standard 12-, 8- and 6-in. square blocks, or with other materials. It may be used vertically or horizontally. It has the same 4-in. thickness as regular glass blocks, but with the center screen is said to have insulating value equal to that of an 8-in. concrete block. Pittsburgh Corning Corp.

20—CURING COMPOUND for exterior concrete

Horncure 40W is a white-pigmented curing compound for roadways, floors, walls and other exterior horizontal or vertical concrete surfaces. A dual-purpose compound, it enables concrete to retain 95 per cent or more of the mixing water for seven days to permit concrete to develop proper compression and flexural strength, says company. Another feature announced is that its white pigmentation reflects the heat of the sun and serves to prevent uneven thermal expansion and premature cracking. A membrane, applied by a single spraying (the white color also promotes uniform coverage by visual observation), Horncure 40W does not require use of burlap, sand and straw or require watering while setting. A. C. Horn Companies.

21—PLASTIC PIPE takes high pressures, temperatures

HTHT Pipe is made from an improved Kralastic resin and is announced as suited for use at temperatures to 180 F and as having tensile strength which allows working pressure ratings averaging 100 psi above other rigid plastic pipe of same IPS size. This new pipe is said to retain all properties of existing Kralastic pipes, including immunity to rust, electrolytic corrosion and corrosion from known soil conditions, and high resistance to a wide range of corrosive chemicals. High impact resistance is reported for HTHT Pipe. It can be cut with a hand saw, and joints made by solvent welding. Schedule 80 IPS pipe may be threaded. HTHT Pipe comes in ½- through 6-in. sizes for working pressures of 100, 125, 150 and 200 psi, and in Schedule 80 IPS for working pressures to 500 psi. Carlon Products Corp.



22—STEAM TRAP for the light condensate loads

Yarway 30 Impulse Steam Trap is designed for economy of operation and maintenance at light loads. The lever-type valve, which pivots about a fulcrum, discharges air and condensate at full capacity at start-up time and snaps shut when steam reaches the trap, providing closer shut-off. Contributing to maintenance economy are a replaceable valve-seat assembly, one moving part, and stainless steel construction. The trap is suggested for use on steam tracer lines, steam main drips, small platens, and similar applications. It comes in ½-in. size for operating pressures 8 to 600 psig. Yarnall-Waring Co.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 211-212.

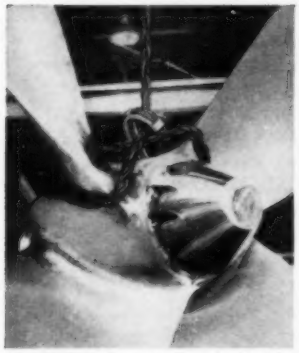
23—ALUMINUM PAINT with high heat resistance

Greater adhesion, increased brightness and longer life are claimed for Heat-Rem H-170, an extra high heat resistant aluminum paint, as the result of recent improvements in its formulation. In it, "non-leafing"

For more facts circle 567 on Reply Card ——→

ONLY ATLAS SLINGS GIVE YOU

MAXIMUM FLEXIBILITY



Even in largest capacities, Atlas Braided Slings are the most flexible slings.

A FIRM GRIP THAT HUGS THE LOAD

The special Atlas Braided body easily adjusts itself to the contour of the load. This provides safe, easy handling.

BALANCED BRAIDED BODY

Each of the eight ropes in the alternate right and left lay braided body carries an equal share of the load providing greater safety and longer rope sling service.

EXTREME LIGHT WEIGHT

Atlas Slings are lightweight for their great strength which provides faster rigging, easier handling, and safer hoisting and carrying to save time and money.

EVERY-DAY SLINGS — Macwhyte Company makes a complete line of slings. There are many standard designs available which have been developed through many years of experience in rigging. In addition to the famous Atlas Braided wire rope slings, there are Macwhyte Drew Flat Braided slings, "Safe-Guard" cable-laid slings, grommets, etc. All are factory fabricated to published strengths for maximum safety. Cable assemblies consisting of wire rope with swaged fittings attached are also available for sling purposes and for control needs on machinery and equipment. Ask to have representative call at no obligation and acquaint you with the complete cost saving wire rope and sling service available from Macwhyte Company and its distributor. We welcome your inquiries for prices on your regular or special needs.

There are many standard types and assemblies of Macwhyte Atlas Braided slings readily available and completely catalogued. Also, slings will be made to your design or Macwhyte engineers will design slings to meet your special load handling requirements. There is a Macwhyte representative close by. Ask for special sling circular 5308R and mention whether or not you want representative to call.

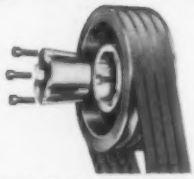
MACWHYTE WIRE ROPE COMPANY,
2991 Fourteenth Avenue, Kenosha, Wisconsin

Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel, Plastic Coated and Nylon Coated Wire Rope, and Wire Rope Assemblies. Special catalogs available.

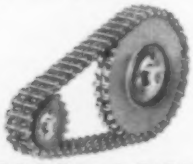
MILL DEPOTS: **New York 4,** 35 Water St. • **Pittsburgh 36,** P. O. Box 10916, 353 Curry Hollow Road • **Detroit 3,** 75 Oakman Blvd. • **Chicago 6,** 228 S. Desplaines St. • **St. Paul 14,** 2356 Hampden Ave. • **Ft. Worth 1,** P. O. Box 605 • **Portland 9,** 1603 N. W. 14th Ave. • **Seattle 4,** 87 Holgate St. **San Francisco 7,** 188 King St. • **Los Angeles 33,** 185 S. Myers St.

116

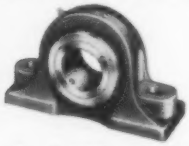
MACWHYTE *Wire Rope* SLINGS



TAPER-LOCK
SHEAVES
Easy on — easy off! Mount flush!



TAPER-LOCK
SPROCKETS
No reboring — no waiting!



SC AND SCM
BALL BEARING PILLOW BLOCKS
"The seal won't blow!"

•

Write for Bulletins!

- Taper-Lock Sheaves. Drive tables and technical data. Bulletin A-661
- Taper-Lock Sprocket and Dodge Roller Chain data. Bulletin A-644
- Rolling Bearings—SC, SCM and Dodge-Timken. Bulletin A-638

DODGE MANUFACTURING CORPORATION
2700 Union Street • Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

For more facts circle 568 on Reply Card

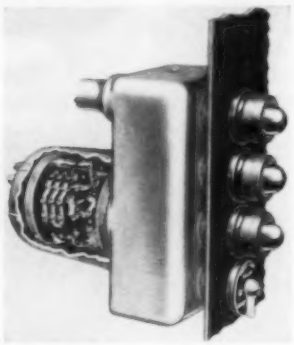
NEW PRODUCTS

(Begins on page 138)

particles are said to remain equally distributed throughout the H-170 vehicle and to provide uniform coverage of aluminum in the applied paint coat. This is reputed to make possible virtual fusion of the paint with hot metal surfaces and to form a protective coating capable of withstanding temperatures up to 1700 deg. The paint is suggested for use on heat transmission lines, traps, stacks, vents, condensers, compressors, ovens, others, etc. Speco, Inc.

24—SIGNALING DEVICE indicates operating conditions

Where constant supervision of manufacturing processes is necessary. Visularm Condulets are designed to provide at-a-glance indication of operating conditions. A high-speed



flasher on the alarm light attracts attention. An independent circuit can actuate a horn, siren or bell. A reset switch silences the audible alarm and changes the alarm light from flashing to steady until the fault is corrected. Visularm Condulets can be used to show normal and abnormal temperatures, pressures, liquid level, speed, load, other conditions. There are two models: Type EKP is explosion proof for use in chemical process industries and in hazardous locations. Type KP is dust-ignition-proof and weather resistant for use in grain handling and food processing plants. Crouse-Hinds Co.

25—BLOWERS have vertical impeller arrangement

Type RAS Blowers feature a vertical arrangement of impellers to provide horizontal inlet and discharge connections resulting in substantial savings in floor space. A "segment waist" impeller contour permits larger volumes and higher pressures at no increase in operating speed, company says, and with lower power costs. Designed to function in either vacuum or pressure applications for handling both air and gas, Type RAS blowers are available in 36 sizes covering capacities from 2000 to 14,000 cfm at pressures up to 6 psig and from 1,500 to 8,000 cfm at pressures to 10 psig. Roots-Connersville Blower, Div. Dresser Industries, Inc.

26—GEARMOTORS for industrial agitator use

This line of Vertical Syncrogear Motors includes ratings from 3 to 30 hp and 25 to 280 rpm. They incorporate features designed for tough mixing jobs—such as processing of pigments, chemicals, foodstuffs and even clays. Among major design features announced for these gearmotors are Lubriflush lubrication, oil circulation window, dry well construction, centrally located service points, start-up oil recess, single-unit cast-iron housing, asbestos-protected windings. Bulletin F-1957 provides full data on these units. U. S. Electrical Motors Inc.

27—A-C MOTOR designed for outdoor operation

This weatherproof a-c motor is announced for use in applications where the motor is subjected to extreme moisture or the elements. An open motor, it is described as exceeding NEMA splash-proof requirements, having external parts of corrosion-proof cast iron. Shaft openings are sealed by a shaft cap and slinger. The non-hygroscopic insulation system features silicone

sleeving, glass-mica slot liners and glass mat top-sticks and mid-sticks.

Formvar wire coils are immersed in thermosetting, oil-and-water resistant varnish and sealed with red finishing enamel. Rotor OD and stator ID are coated with a rust inhibitor, and a non-washing grease is used in the Metermatic bearings, which meter grease from the reservoirs as needed. The watertight conduit box is cast iron with a gasketed

DODGE PILLOW BLOCKS

Timken Bearing Equipped

America's super-quality line—with a 34-year record of keeping performance *up* and costs *down!* Five types—to fit practically any service condition. All assembled, adjusted, lubricated and *sealed* at the factory for precision performance—long life—dependability.

SPECIAL DUTY TYPE →

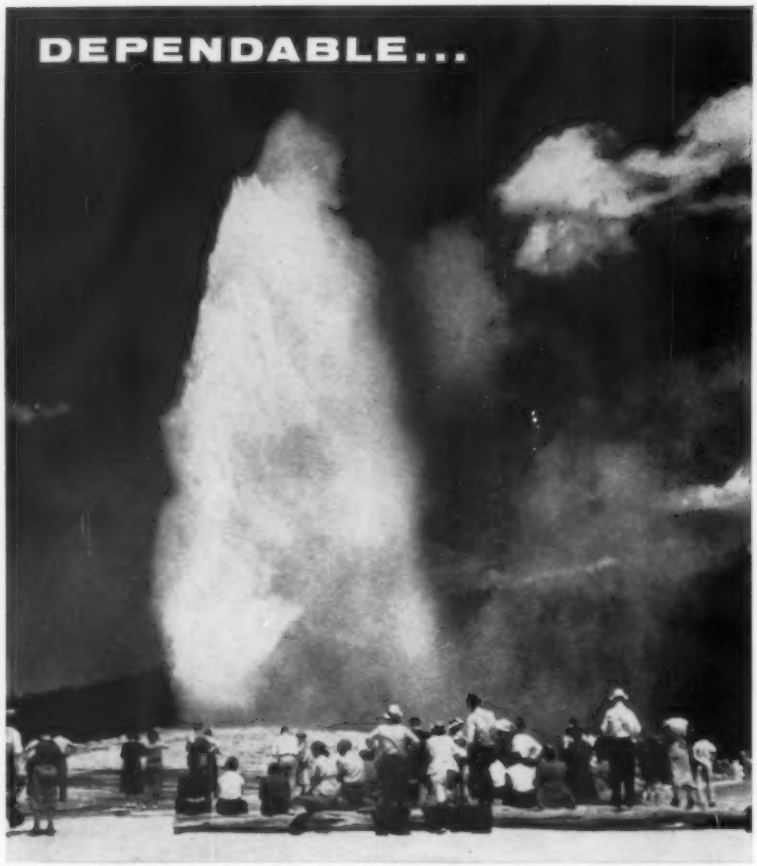
- Designed for extreme precision and high load capacities.
- Fully self-aligning.
- Special Duplex Timken Roller Bearing with tapered bore.
- Split tapered sleeve with straight cylindrical bore extends through entire length of housing.
- Easy to mount or demount. Adapter nut (or collar) clamps adapter sleeve to shaft with extreme firmness.
- Automotive type piston ring seals. Bearing is sealed both on and off the shaft.
- Rugged semisteel outer housing.
- Elongated bolt holes provide for lateral adjustment.
- Special dust cap protects lubrication fitting.
- Shaft sizes 1⅞" to 8". Ask your local Dodge Distributor—or write us for Bulletin A670 giving complete technical data on America's most complete line of mounted bearings.

DODGE MANUFACTURING CORPORATION, 2700 Union St., Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look in the *white* pages of your telephone directory for "Dodge Transmissioneer."

DODGE
of Mishawaka, Ind.

For more facts circle 569 on Reply Card



DEMING PUMPS

proven performance in industry

Through dependable performance it has become a matter of record that "Old Faithful" performs by the clock. It's also a matter of record that dependable Deming Pumps are recognized throughout industry for proven performance . . . and the ability to handle a wide variety of liquids for diversified industrial applications.

A wide selection of more than 10,000 types, sizes and capacities to meet your specific industrial requirements is available from the complete, Deming line of Pumps.

Depend on Deming . . . write for complete information.

THE DEMING COMPANY 532 BROADWAY, SALEM, OHIO

Please send me a copy of your Industrial Pump Bulletin I-57-E describing pumps for every industry.

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

For more facts circle 570 on Reply Card

NEW PRODUCTS

(Begins on page 138)

cover and threaded outlet. Protective screening for ventilating openings can be furnished. Reliance Electric and Engineering Co.

28—HAND TACHOMETER is accurate, easily read

Dial diameter of the Jagabi Precision Hand Tachometer is 4.7 in. (120 mm) and the scale calibration is conveniently open and easily readable, it is pointed out. This

single-range tachometer is suggested for accurate speed measurements in laboratories, test beds and in quality control or production tests. According to manufacturer, the sturdy construction of this instrument contributes to low maintenance and dependability. The tachometer is supplied with two large rubber mounted male and female centers, an extensive shaft and center, oil container and dropper and comes in a strong case. Total weight is 3¼ lb. Bulletin 35-52 gives details on the instrument. James G. Biddle Co.

29—ROOF EXHAUSTER is quiet, light and strong

Moulded in reinforced Fiberglas, the Super/Air-Van is a power roof exhauster claimed to offer inherent quietness, structural strength equal to steel and impact strength greater than aluminum or steel, light weight and corrosion resistance. Company points out that reinforced Fiberglas is unaffected by salt spray and is resistant to most common acids, gases, greases and moisture-laden air. Painting isn't needed, according to manufacturer, because the color saturated material is permanent, and the insulating qualities of reinforced Fiberglas offer increased protection to the exhauster motor. Super/Air-Vans incorporate a scroll design to give efficiency to 4-in. static pres-

up, UP again!

goes the value of the RLM LABEL on all these lighting units made by these leading manufacturers

This label identifies the RLM-certified lighting equipment of 27 leading manufacturers.

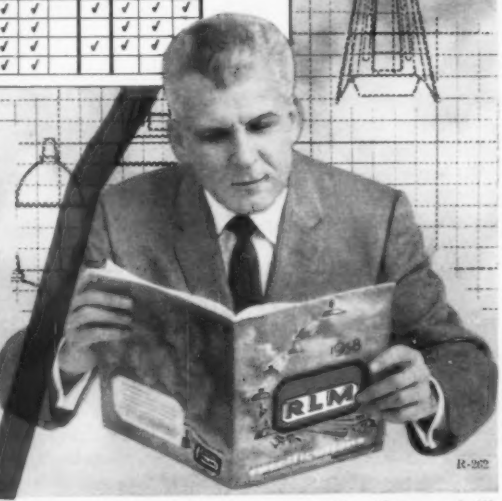
	INCANDESCENT RLM SPECIFICATIONS						FLUORESCENT RLM SPECIFICATIONS									
							8-15% UPLIGHT						20-30% UPLIGHT			
	#1 100-1000w Dome	#2 100-1000w Deep Bowl	#3 100-1000w Semi-Angle	#4 500 & 1000w High Bay	#18 200-1000w Glassteel Diffuser	#40 500 & 1000w High Bay *	D-1 2-40w 1A-1B	D-1 2-75w 1D	D-1 2,800 ma 1E	D-2 3-40w 2A-2B	D-2 3-75w 2D	D-2 2,800 ma 2E	D-3 2-90 & 4-40w 3A-3B	SD-1 2-40w 1A-1B	SD-1 2-75w 1D	SD-1 2,800 ma 1E
ABOLITE LIGHTING DIV.				1		1										
APPLETON ELECTRIC CO.	3	3	3		1											
BENJAMIN ELECTRIC MFG. CO.	5	4	4		1		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DAY-BRITE LIGHTING, INC.							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
EASTERN FIXTURE CO., INC.							✓	✓		✓						
ELECTRO LIGHTING CORP.	6	4					✓	✓				✓	✓			
ENDER-MONARCH CORP.							✓	✓		✓						
FLUORESCENT FIXTURES OF CALIFORNIA							✓	✓	✓	✓	✓	✓		✓	✓	
GLOBE LIGHTING PRODUCTS, INC.							✓	✓		✓	✓				✓	
THE EDWIN F. GUTH CO.							✓									
KEYSTONE ELECTRIC MFG. CO.							✓	✓		✓	✓					
LIGHTING DYNAMICS, INC.							✓	✓		✓	✓		✓	✓		
THE MILLER CO.	4			2			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MITCHELL LIGHTING DIV.								✓		✓	✓					
MULTI ELECTRIC MFG., INC.	4			2		1	✓									
OVERBAGH & AYRES MFG. CO.	4	3	3													
QUADRANGLE MFG. CO.	5	3	5		2											
RUBY-PHILITE CORP.							✓	✓	✓	✓	✓			✓	✓	✓
SMITHCRAFT LIGHTING DIV.							✓	✓		✓	✓					
SMOOT-HOLMAN CO.	3	3	3				✓	✓	✓	✓	✓	✓		✓	✓	✓
THE SPERO ELECTRIC CO.	4	1		1		1										
THE STEBER MFG. CO.	4		2													
SUNBEAM LIGHTING CO.							✓	✓	✓	✓	✓	✓		✓	✓	✓
SYLVANIA ELECTRIC PRODUCTS, INC.							✓	✓	✓	✓	✓		✓	✓	✓	✓
WESTINGHOUSE ELECTRIC CORP.	5	4	2		2		✓	✓		✓	✓			✓	✓	
WHEELER REFLECTOR CO.	5	4	2				✓	✓	✓	✓	✓		✓	✓	✓	
WORK-O-LITE CO.							✓	✓		✓	✓					

* Aluminum Reflectors all others are Porcelain Enamel

Note: Many manufacturers make incandescent RLM Units for more than one lamp size. The numerals refer to the number of different-size RLM Units which the manufacturer offers under the specification.

RLM ADDS NEW SPECIFICATIONS FOR SPECIAL SERVICE FLUORESCENTS.....REVISED SPECS COVER UNITS FOR 800 ma. LAMPS.....BROADENED INCANDESCENT STANDARDS FOR REFLECTOR SIZES AND TYPES OF LAMPS.....EVERY RLM SPEC STRENGTHENED, MADE MORE IMPORTANT, REVISED UP!

These are some of the reasons why the leading manufacturers listed above are especially proud today, to bring you units bearing the RLM Label. They know that, by keeping pace with latest industrial lighting advancements, RLM now stands for more lighting quality than ever.



R-202

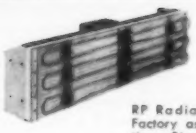
Send for Free 1958 RLM Specifications Book. Write: RLM Standards Institute, Suite 8310, 326 W. Madison St., Chicago 6, Ill.

For more facts circle 571 on Reply Card

Type RAD Heater—Used singly or joined to form ovens or heating banks. Standard lengths from 24⅛" to 85¾".

Adjustable Area U-RAD®—Matches heat intensity to work area. Up to 26 different heated lengths, using 6 different size elements.

FRB Metaray®—No glass, no glare. Fits your present lamp sockets.



RP Radiant Panels—Factory assembled sections. Sizes from 12" x 48" to 24" x 66". Work temperatures to 700°F.

Production line heating problems? Your CHROMALOX Man has the Answers

Unrelated as they may seem, the products shown above have at least one thing in common . . . each presented an unusual heating problem, and Chromalox Electric Far-Infrared provided the best answer.

To cure a long-lasting, no-chip, no-peel finish, the plastic bodies of Cushman Motor's "Mailsters" receive baked enamel treatment in an oven heated by Chromalox type RAD Heaters.

Vacuum forming of plastics poses other problems handled by Chromalox Far-Infrared. To obtain deep draws in plastic door liners for refrigerators, Admiral Corporation uses a bank of Chromalox U-RAD® Heaters.

Chromalox Far-Infrared has proved to be the best heat source for many other materials, too. For example, when radiant heat lamps proved too "spotty" for curing General Tire & Rubber Co. white sidewalls, the oven was refitted with 150 Chromalox Metaray® Heaters.

Loss due to shelf spoilage of dog food is still another type of problem solved by Chromalox Far-Infrared. The manufacturers of Joy Dog Food use Chromalox Far-Infrared panels installed over the conveyor line to sterilize their product before packaging.

Chances are *you* have a production line heating problem that can best be solved with Chromalox Far-Infrared Heat. You can soon find out. Just call your Chromalox Man listed at the right. He's backed by the world's largest stock of industrial electric heaters, ready for immediate shipment. And he offers factory design-engineering service for special applications.

2612

CHROMALOX
Electric Heat
INDUSTRIAL • COMMERCIAL • RESIDENTIAL
EDWIN L. WIEGAND COMPANY
7553 Thomas Boulevard • Pittsburgh 8, Pa.

For more facts circle 572 on Reply Card

Call Chromalox

for the man with the ELECTRICAL ANSWERS to your heating problems

ATLANTA 9, GA.
Applebee-Church, Inc.
1389 Peachtree St., N.E.
Trinity 5-7244

BALA-CYNWYD, PA.
J. V. Calhoun Company
349 Montgomery Ave.
Mohawk 4-6113
Greenwood 3-4477

BALTIMORE 18, MD.
Paul V. Renoff Company
333 East 25th St.
Hopkins 7-3280

BINGHAMTON, N. Y.
R. P. Smith Co., Inc.
94 Henry St.
Phone 4-7703

BLOOMFIELD, N. J.
R. L. Faber & Assoc., Inc.
1246 Broad St.
Edison 8-6900
New York: Worth 4-2990

BOSTON 11, MASS.
Leo E. Pelkus & Co., Inc.
683 Atlantic Ave.
Liberty 2-1941

BUFFALO 2, N. Y.
Niagara Electric Sales Co.
505 Delaware Ave.
Summer 4000

CHARLOTTE 2, N. C.
Ranson, Wallace & Co.
116½ E. Fourth St.
Edison 4-4244
Franklin 5-1044

CHATTANOOGA 1, TENN.
H. R. Miles & Associates
P. O. Box 172
Amherst 5-3862

CHICAGO 5, ILL.
Fred I. Tourtelot Company
407 S. Dearborn St.
Harrison 7-5464

CINCINNATI 8, OHIO
The Smysor Company
1046 Delta Ave.
Trinity 1-0605

CLEARWATER, FLA.
J. J. Galleher
617-A Cleveland St.
P. O. Box 1376
Phone 3-7706

CLEVELAND 13, OHIO
Anderson-Bolds, Inc.
2012 W. 25th St.
Prospect 1-7112

DALLAS 26, TEX.
L. R. Ward Company
3009 Canton St.
Riverside 1-6279

DAVENPORT, IOWA
Volco Company
215 Kahl Building
Phone: 3-2144

DENVER 2, COLO.
E. & M. Equipment Co.
2415 Fifteenth St.
Glendale 5-3651
Genesee 3-0821

DES MOINES 14, IOWA
Midwest Equipment Co. of Iowa
842 Fifth Ave.
Cherry 3-1203

DETROIT 38, MICH.
Carman Adams, Inc.
15760 James Couzens Hy.
University 3-9100

HOUSTON 3, TEX.
L. R. Ward Company
3605 Polk Ave.
Capitol 5-0356

INDIANAPOLIS 4, IND.
Couchman-Conant, Inc.
627 Architects & Builders Building
Melrose 5-5313

KANSAS CITY 6, MO.
Fraser D. Moore Co.
106 E. 14th St.
Victor 2-3306

LOS ANGELES 15, CALIF.
Montgomery Brothers
1053 S. Olive St.
Richmond 7-9401

MIDDLETOWN, CONN.
Dittman and Greer, Inc.
33 Pleasant St.
Diamond 6-9606

MILWAUKEE 3, WIS.
Gordon Hatch Co., Inc.
531 W. Wisconsin Ave.
Broadway 1-3021

MINNEAPOLIS 4, MINN.
Volco Company
831 S. Sixth St.
Federal 6-3373

NASHVILLE 4, TENN.
H. R. Miles and Associates
2500-B Franklin Rd.
Cypress 2-7016

NEW YORK CITY, N. Y.
See "Bloomfield, N. J."

OMAHA 2, NEB.
Midwest Equipment Co.
1614 Izard St.
Atlantic 7600

PHILADELPHIA, PA.
See "Bala-Cynwyd, Pa."

PITTSBURGH 6, PA.
Woessner-McKnight Co.
1310 Highland Building
115 S. Highland Ave.
Emerson 1-2900

PORTLAND 9, ORE.
Montgomery Brothers
1632 N.W. Johnson St.
Capitol 3-4197

RICHMOND 25, VA.
O. M. Thompson
Westhampton Station
P. O. Box 8762
Atlantic 8-8758

ROCHESTER 4, N. Y.
Niagara Electric Sales Co.
133 Clinton Ave. S.
Hamilton 6-2070

ST. LOUIS 1, MO.
C. B. Fall Company
317 N. 11th St.
Suite 1001
Chestnut 1-2433

SAN FRANCISCO 3, CALIF.
Montgomery Brothers
1122 Howard St.
Underhill 1-3527

SEATTLE 4, WASH.
Montgomery Brothers
911 Western Ave.
Main 4-7297

SYRACUSE 6, N. Y.
R. P. Smith Co., Inc.
2507 James St.
Howard 3-2748

WICHITA 2, KAN.
Fraser D. Moore Co.
Room 211 Derby Building
352 N. Broadway
Amherst 2-5647

2612

NEW PRODUCTS

(Begins on page 138)

sure. The motor is out of the airstream. The units feature a low installed silhouette. Maximum curb is 4 in. Capacities range from 100 to 11,000 cfm; static pressures to 4 in. The Gallaher Co.

30—DRY FLUID DRIVES in larger, smaller sizes

Added to the line of Flexidyne Dry Fluid Drives and Couplings are three larger sizes and a new small size, covering a capacity range from ¼ to 1000 hp. The larger ones include an 18-in. diam Flexidyne available either as a drive for use with V-belts, or as a coupling for direct shaft-to-shaft connection, either delivering up to 200 hp at 1200 rpm. The next larger size, the 22CK, is available only as a coupling and capable of transmitting up to 800 hp at 1200 rpm. Largest of the new units is a 27-in. coupling, 27CK, rated up to 1000 hp at 900 rpm. For medium light applications, such as fans and small conveyors, there is a new 6-in. Flexidyne, available as a coupling or for use with V-belt drives, rated at up to 2 hp at 1800 rpm. Dodge Mfg. Corp.

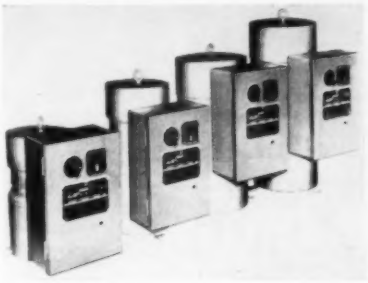
31—IMPROVED AMMETER measures both a-c and d-c

Included in engineering changes in the new Tong Test Ammeter is a larger damping chamber for each scale range which makes readings easier by providing improved damping characteristics. Other new features noted are heavier and stronger

scale range construction, insulated operating trigger and plastic handle. To operate Tong Test all you have to do is press the trigger and snap the tongs around an electrical conductor without breaking circuit or insulation — and readings are obtained. Tong Test is constructed without coils or windings so there is no danger of burnouts, company says. It is available in eight types and measures up to 1000 amp, and is equipped with larger interchangeable ranges to make it impossible to read wrong scale. Columbia Electric Mfg. Co.

32—BATTERY CHARGERS take up less space

These vertical motor-generator chargers for electric industrial truck batteries are reported to save approximately two-thirds the floor space needed for comparable horizontal models. They can also be off-floor mounted. Part standardization



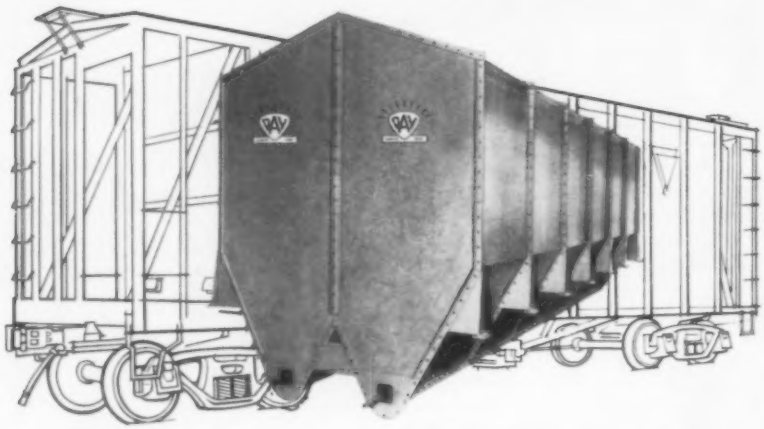
and simplification of design offer additional economies. These single-circuit, fully automatic chargers also offer a wide choice of electrical ratings to permit better matching of charger to individual battery requirements. Although made in only four different physical sizes, these chargers provide a choice of 25 ratings ranging from 0 to 800 amp-hr. Because of better matching, these machines more closely maintain prescribed voltages during charging cycles, according to manufacturer. Exide Industrial Div., The Electric Storage Battery Co.

33—CYLINDERS are designed for greater safety

Safety features of these hydraulic cylinders include use of Teflon for seals that seal against external leakage, and construction designed to eliminate oil leakage. Two-fold protection is claimed for the Teflon seals: Teflon is immune to the destructive chemical action of non-inflammable hydraulic fluids used in many safety-minded plants; and its ability to withstand high temperatures—to 450 F—permit use in plant "hot spots" and on equipment where higher temperatures are generated. Other safeguards against leakage offered by the cylinders include rod seals that seal with Teflon, and case-hardened chrome-plated piston rods

DAY

BULK STORAGE NEWS



A CARLOAD OF STORAGE IN ONE 'PACKAGE'

SAVE! Store Ingredients in bulk with **DAY** Tanks

Here's a "package" that's engineered and built for heavy duty service. Compared to bags or other containers, DAY Bulk Tanks store more materials, in less space, faster, better and cheaper. By eliminating bag and labor costs they save up to 35¢ on every 100 lbs. of bulk material handled.

DAY tanks are large enough to actually store a carload or more of material in a single tank. They may be pneumatically or mechanically loaded and emptied. Made in vertical and horizontal styles, DAY tanks are built and shipped in easily erected sections. They have been proven in a wide range of applications. They are sturdily constructed of galvanized, black or stainless steels or aluminum.

Write toDAY for Bulletin 574. This 12-page booklet gives specifications plus money saving facts about sanitary, weatherproof DAY tanks.

The **DAY** *Company*

SOLD in UNITED STATES by The DAY SALES Company 807 Third Ave. N. E., Minneapolis 13, Minn.

MADE and SOLD in CANADA by The DAY Company of Canada Limited 12 Brydon Drive, Rexdale (Toronto), Ontario

Representatives in Principal Cities

EQUIPMENT ONLY OR A COMPLETE SYSTEM

For more facts circle 573 on Reply Card

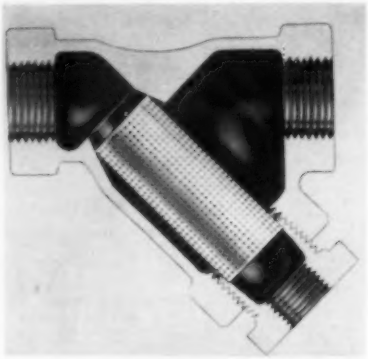
NEW PRODUCTS

(Begins on page 138)

with Teflon dirt wipers. Hydraulic cylinders incorporating these features include company's Job-Rated line for 500 to 2500 psi service and Power-Packed line for 3000 to 5000 psi service. Miller Fluid Power Div., Flick-Reedy Corp.

34—PIPELINE STRAINER is self-cleaning unit

Features announced for the Type AT Strainer are high strength construction of the semi-steel ASTM-A48-48, class 30) bodies, an internal design that assures tight fit of the



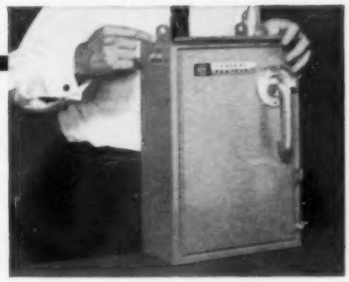
screen cylinder without buckling, perforated heavy gage screen with spot welded lap seams for maximum rigidity with smooth inner surfaces, and built-in sediment collection chamber integral with cap. The 45-deg design facilitates clearing by blow-off. The strainer is rated for saturated steam or liquids to 250 psi and 475 F total temperature. It is available in sizes from ¼ through 3 in. Sarco Co.

35—PARTITIONING SYSTEM is re-usable, economical

ColorLine is the name of a low-cost partitioning system based on metal framing. It requires only simple tools and stock framing parts and connections, along with standard or special paneling materials and glass. The metal framing is manufacturer's Unistrut, consisting of a metal channel with continuous open slot down the middle of one side, a spring-held clamping nut, and framing fittings for attachments. The system is said to provide a lower installation cost and lower relocating costs. The framing is designed to accommodate any paneling material from ⅛- to ½-in. thickness, and any type of paneling may be used—plywood,

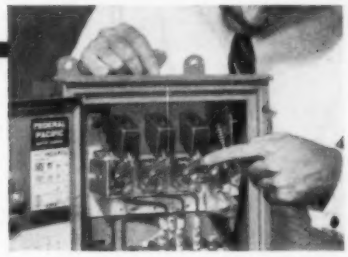
Before you buy Motor Controls... CONSIDER THESE FEATURES!

SUPERIOR ENCLOSURE CONSTRUCTION



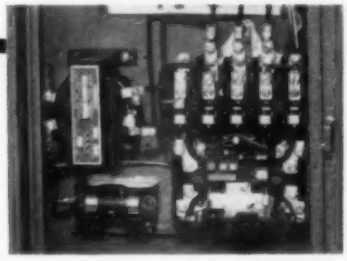
Welded seams...sturdy piano hinge...slotted Hex cover retaining screws...cast aluminum handle...padlock provisions on handle *and* door...oil resistant neoprene gasket...mechanical cover interlock...rust-proof finish.

COOLER, SAFER SWITCHES



Visible blades...crossbar *under the blades*...deionizing arc quenchers.. dual switchblade construction...only 2 joints per pole...pressure-type solderless lugs.

INLINE SOLENOID STARTERS



Easy-to-change, silver cadmium contacts...contact assembly rides on ball bearings...operating coil easily accessible...flexible coil leads...bi-metallic overload relay for manual or automatic resetting.

FEDERAL PACIFIC'S TYPE "K", NEMA XII COMBINATION MOTOR STARTER

Designed for mass production industrial equipment, the quality features found in the Type "K" are typical of the kind of construction that goes into every device in the Federal Pacific line. Federal Pacific's manual or magnetic motor controls are available in NEMA sizes 0 through 5—with accessories to meet all practical requirements. Bulletin 514 gives full details on combination starters. For this or for specific information to cover your particular needs, write to: FEDERAL PACIFIC ELECTRIC COMPANY, General Offices: Newark, New Jersey.

FEDERAL FPE PACIFIC

The Best in Electrical Distribution and Control Equipment

For more facts circle 574 on Reply Card

Here's a cable supporting system with space reserved for future needs

Cope cable trough gives your system room for growth!

Cope cable trough design gives you greater load carrying capacity per dollar *now—plus built-in system expansibility* that will minimize the cost of future system expansion. A *single* 24" wide section of Cope cable trough supports as many cables as 16 lengths of 4" conduit. Additional cables can be quickly and easily laid in *existing* trough as new equipment installations require. The lower *first* cost of a Cope cable trough installation *saves you money a second time* when you need to increase or expand your power distribution system!

Reduced System Maintenance Costs. Easy-to-get-at Cope cable trough also eliminates costly maintenance problems down the line. Once cable is laid in Cope expanded metal trough, it's readily accessible for easy inspection, repair . . . or *re-routing* when system changes are required. And greater installation flexibility of lightweight Cope cable trough and a complete line of system accessories and fittings reduce design time up to 25% for laying out the most complicated system . . . assure easy system maintenance even in the most cramped quarters.

Cut Costs Three Ways. You save *three ways* when you specify Cope cable supporting systems with pin-type coupler . . . trough, ladder or channel.

- **LOWER FIRST COST**
- **LOWER INSTALLATION COSTS**
- **LOWER SYSTEM MAINTENANCE COSTS**

Discuss these advantages for *your* installation with a qualified Cope representative—or write to T. J. Cope Division, Rome Cable Corporation, Collegeville, Pa.

T. J. COPE *Division*
ROME CABLE CORPORATION

For more facts circle 575 on Reply Card

NEW PRODUCTS

(Begins on page 138)

natural wood, plastic, metal, hardboard, pressed wood, wall boards, expanded metal, glass, other. Doors and shelving can be fitted into the framing. Unistrut Products Co.

36—SOLIDS PUMPS in horizontal, vertical models

Types D and DL Wemco Torque-Flow Pumps are announced as available in a vertical as well as horizontal model. They are also available with a variety of drives, including belt, close coupled, pedestal mounted and extended shaft. The Type D comes in both 4- and 6-in. sizes for general duty pumping of solids even at high heads and high capacities. Model DL is a smaller version of the same pump, available only in 4-in. size and suggested for low head applications. Both new pumps retain design characteristics of earlier Wemco Torque-Flow Pumps, says manufacturer, including the recessed impeller which makes the pump non-clogging and resistant to abrasion. Western Machinery Co.

Use the Reader Service Cards provided on pages 211-212 to ask for more information on these products. Circle item numbers of products in which you are interested.

37—LAMP BALLASTS have appropriate circuits

These mercury lamp ballasts have appropriate electrical circuits required by each lamp-type and input voltage condition, it is announced. Three basic "lamp designed" types of circuits are used. Designated LD-S, LD-R and LD-A they come in five basic construction designs. Stabilizing ballast LD-S consists of an isolating transformer and a circuit designed to provide better lamp current regulation and lower drop-out voltage over an extended input voltage range than afforded by the other two types. Accurately controlled lamp current and rated ballast life are said to be obtained by this high power factor design over input voltage range ±13 per cent.

Type LD-R ballast is a reactor used in series with a lamp. This unit's circuit is for line voltages approximately twice the rated lamp

For more facts circle 576 on Reply Card →

Only G-E Ignitrons Come PROVED for Welding Service!

General Electric is the only builder of ignitrons to use test equipment which fully proves tubes under actual welding conditions. Tests are made at voltages and currents exceeding maximum requirements.

Occupying over 3,100 cubic feet of area, General Electric's extensive test equipment probes for—and rejects—any operating faults which might affect the performance of G-E ignitrons in your plant, such as improper ignitor firing, tube arc-backs, etc.

Here is unexcelled protection for your dollar investment in ignitrons! Here is the best possible assurance that your welder downtime will be kept low—that production will remain high.

Install General Electric *full-load-tested* ignitrons! Made in the widest range of sizes and types. Fully competitive in price . . . stocked by a G-E tube distributor who is near you. Phone him! *Distributor Sales, Electronic Components Division, General Electric Company, Owensboro, Kentucky.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

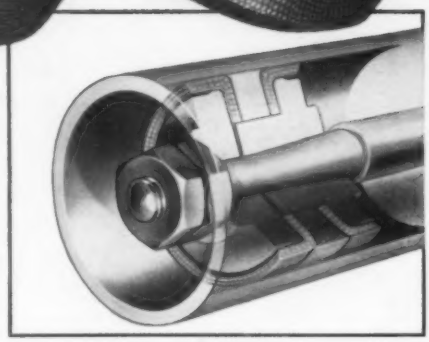
11-12-102

PUMCUP ADVANTAGES

now yours for

- HYDRAULIC CONTROLS
- AIR CYLINDERS
- RECIPROCATING PUMPS

Two common Pumcup types: conventional and 45° bevel type . . . available in a complete range of sizes and texture-engineered compositions.



Cutaway view of typical Pumcup installation resulting in prolonged high efficiency.

TAKE it from experienced users, Darcova Pumcups offer payoff advantages that can't be equalled! For example, they last many times as long as ordinary piston packing..and they *hold peak efficiency* from start to finish. Because of the resulting production and maintenance economies, plant after plant is standardizing on Pumcups.

Improved application of the cup principle does the trick. And Darcova Pumcups are *texture-engineered* in *a range of compositions* to meet most temperature-pressure-fluid conditions. And they are available in sizes and types exactly right for your particular equipment.

It will pay you to get *all* the facts. Just ask for Pumcup Bulletin No. 5503.

DARLING VALVE & MANUFACTURING CO.
Williamsport 14, Pa.

DARCOVA
THE ORIGINAL COMPOSITION CUP
TRADE MARK
PUMCUPS

For more facts circle 577 on Reply Card

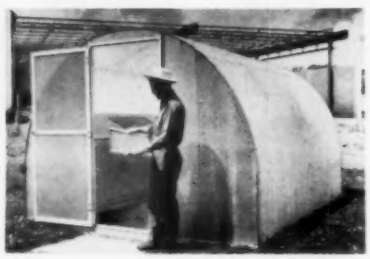
NEW PRODUCTS

(Begins on page 138)

voltage. An LD-A ballast is required when lamp voltage is other than that for which an LD-R circuit is used. This type is an autotransformer with a reactor included. Proper lamp operations and rated ballast life can also be obtained with the Types LD-R and LD-A over an input voltage range of ±5 per cent, says manufacturer. Their circuits come in high or normal power factor. General Electric Co.

38—JOB SHACK of reinforced plastic panels

The Kemhut is 10 ft wide, 12 ft long and 7 ft high, made of fiber glass reinforced translucent panels. Designed for use as a construction job office, the quickly erected Kemhut can also serve as tool crib or equipment



storage. It is light in weight (about 150 lb) and can be transported on a flat bed truck. Dismantled, it requires little storage space. The Kemhut may be staked to the ground like a tent or secured to a perimeter of wood 2-by-4's. For more permanent installation, it may be bolted to a foundation but internal bracing is not required, manufacturer states. The Kemhut comes ready to assemble complete with pre-cut panels, ventilating louver, hinged door, aluminum angles, fastening and hardware. Company says assembly takes only a few hours. Kemlite Corp.

39—FORK TRUCK works in limited areas

This light weight straddle-type truck of 4000-lb capacity is for plants limited in storage area or requiring narrower aisles to increase storage capacity. The stacker's straddle design permits carrying load on forks between outrigger arms which eliminates the need for counterweight, thus keeping the total truck weight to a minimum. Its short overall length makes it maneuvable for stacking in narrow aisles and operating in confined areas. Available in

Copon Arocoat—the Proven Epoxy-Coal Tar Coating

Unique formula cures quickly into a tough, tightly bonded, abrasion resistant shield against corrosive chemicals and fumes.

Copon Arocoat, the newest member of the Copon line of coatings specifically designed for corrosion control, is providing new answers for many of industry's toughest and most expensive corrosion problems.

Arocoat has been used profitably to cut traditional corrosion losses in paper mills . . . to add new life to condensate tanks and vessels, hopper cars, casing and conveyors . . . to provide internal or external protection for acid, alkali, sour crude and brine storage tanks . . . to reduce maintenance costs on cooling tower equipment.

Economically applied by spray or brush, it has also been used to provide superior protection for marine equipment and submerged, buried and exposed gas and petroleum transmission lines.

If you have a corrosion problem that seems to defy profitable solution, get complete information on Copon Arocoat. Write today to the Copon Associate located nearest to your city.

Copon.

FOR CORROSION CONTROL

Normal Copon — the versatile maintenance coating • **Activated Copon** — for greater chemical resistance • **Copon Mastic** — high build for critical areas • **Copon Met-L-Pon** — the metallic zinc coating • **Copon High Bake** — the ultimate in chemical-resistant coatings.

COPON ASSOCIATES

BENNETT'S
65 W. First South St., Salt Lake City, Utah

WALTER N. BOYSEN CO.
42nd and Linden Sts., Oakland 8, Calif.
2309 E. 15th St., Los Angeles, Calif.

BRITISH AMERICA PAINT CO., LTD.
P. O. Box 70, Victoria, B. C., Canada

BROOKLYN PAINT & VARNISH CO., INC.
50 Jay Street, Brooklyn 1, N. Y.

COAST PAINT & LACQUER CO.
P. O. Box 1113, Houston 1, Texas

COAST PAINT & LACQUER De MEXICO, S. A.
Apartado Postal No. 9637, Mexico, D. F.

ENTERPRISE PAINT MANUFACTURING CO.
2841 S. Ashland Ave., Chicago 8, Ill.

INDUSTRIAL PAINT MANUFACTURING CO.
P. O. Box 2371, Birmingham 1, Alabama

E & F KING AND COMPANY, INCORPORATED
640 Pleasant Street, Norwood, Mass.

KOHLER-McLISTER PAINT CO.
P. O. Box 546, Denver 1, Colo.

McDOUGALL-BUTLER CO., INC.
2929 Main St., Buffalo 14, New York

MULSYN PAINT & CHEMICALS
64-70 Hanover Street
Fitzroy, N. 6, Melbourne, Aust.

JAMES B. SIPE and COMPANY, INC.
P. O. Box 8010, Pittsburgh 16, Pa.

SOCIETE DES VERNIS PYROLAC
51, Rue De Lechat Creteil (Seine), France

WILBUR & WILLIAMS COMPANY
130 Lincoln Street, Boston 35, Mass.

Mail to the Copon Associate located nearest your city.

_____Send complete information on Copon Arocoat.

_____I would like to discuss a corrosion problem with one of your technical representatives.

NAME_____

TITLE_____

FIRM_____

ADDRESS_____

CITY_____ STATE_____

For more facts circle 578 on Reply Card

WHITNEY BLAKE
HIGH QUALITY...

STATION CONTROL CABLES

RH-RW Rubber Insulation
Neoprene Jacket

Polyethylene Insulation
PVC Jacket

PVC Insulation
PVC Jacket

Because Whitney Blake specializes in the manufacture of high quality wire and cables you will obtain long, efficient service from Whitney Blake Station Control Cables.

Rubber insulated and PVC insulated types are rated at 600 volts; polyethylene insulated types at 1000 volts. All are manufactured to IPCEA Specification S-19-81. They are designed for aerial, duct or direct burial installation.

Whitney Blake Station Control Cables can be supplied to your specification or designed for your application. Write for information on special constructions or for complete data on standard types.

WB

WELL BUILT WIRES SINCE 1899

WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

For more facts circle 579 on Reply Card

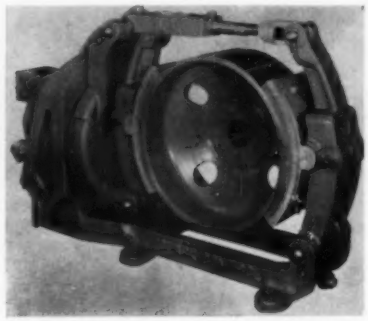
NEW PRODUCTS

(Begins on page 138)

two models, the WOTX, for use in extremely narrow aisles, has only a 7-in. long battery compartment with an overall length of 30-in., less load; the WOT has a 10½-in. long battery compartment and 33½-in. overall length, less load. Automatic Transportation Co., Div. The Yale & Towne Mfg. Co.

40—DC- MOTOR BRAKES offer simplicity of adjustment

The Bulletin 106 line of d-c brakes is announced as featuring high rigidity, simplicity of adjustment, and easy servicing without disturbing torque adjustment. It is designed to meet NEMA-AISE standards for use with NEMA 600 series mill-type motors and equivalent sizes of



standard motors. This cast steel brake utilizes a "nut-cracker" design, hinged at top, for equal distribution of applied pressure. The mounting method used holds shoes in spring-loaded sockets without depending on pins to connect them to the arms. A partial turn of a wrench releases pressure so shoes can be slid out to the side without removing the wheel. Cast aluminum brake shoes are self-aligning and interchangeable end-for-end and with each other. Maintenance adjustments are made from the top of the brake, and all adjustment, maintenance, assembly and disassembly can be done with screwdriver and wrench. Clark Controller Co.

41—PRESSURE GAGES for general purpose applications

A-Line Pressure Gages include modern counterparts of company's general purpose line, the 500 Series, with design improvements in accuracy, movements, Bourdon tubes and optional extras. Costwise, this line is between company's higher accuracy Super-gauge line and the

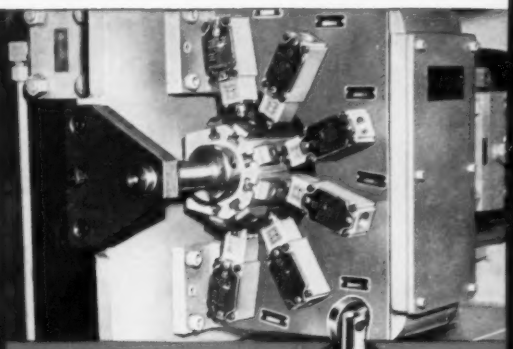
For more facts circle 580 on Reply Card →

ALLEN-BRADLEY

BULLETIN 802T

OILTIGHT

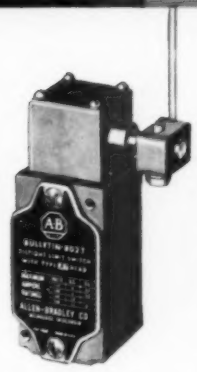
LIMIT SWITCHES



Radial mounting of six Allen-Bradley "manifold" type, push roller, oiltight limit switches.

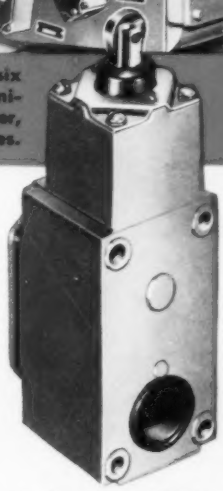
SIDE PUSH ROD

FORK LEVER TYPE

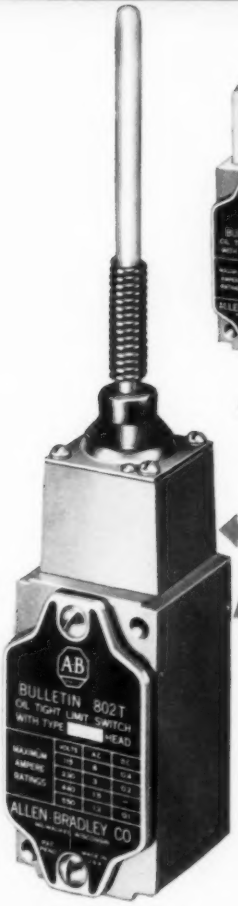


ADJUSTABLE ROD

TOP PUSH ROD WITH PLASTIC WINDOW



Push roller, oiltight limit switch, showing rubber grommeted wiring hole on back of "manifold" type, used on above automatic production machine made by Cross Company, Detroit.



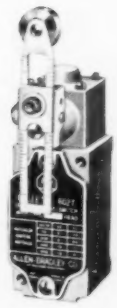
WOBBLE STICK TYPE

OIL SEALED HEAD AND BODY

assure reliable operation

Completely sealed . . . oil, dirt, and metal chips cannot foul up contacts or operating mechanism. Operating heads are interchangeable—can be mounted in any one of four positions. New "wobble stick" heads operate in any direction. All of these limit switches have maintenance free, double break, silver alloy contacts. Specify Allen-Bradley—the *quality* line of limit switches.

ROLLER LEVER FOR CAVITY MOUNTING



ADJUSTABLE ROLLER LEVER

A-B QUALITY

ALLEN-BRADLEY

MOTOR CONTROL

QUALITY

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

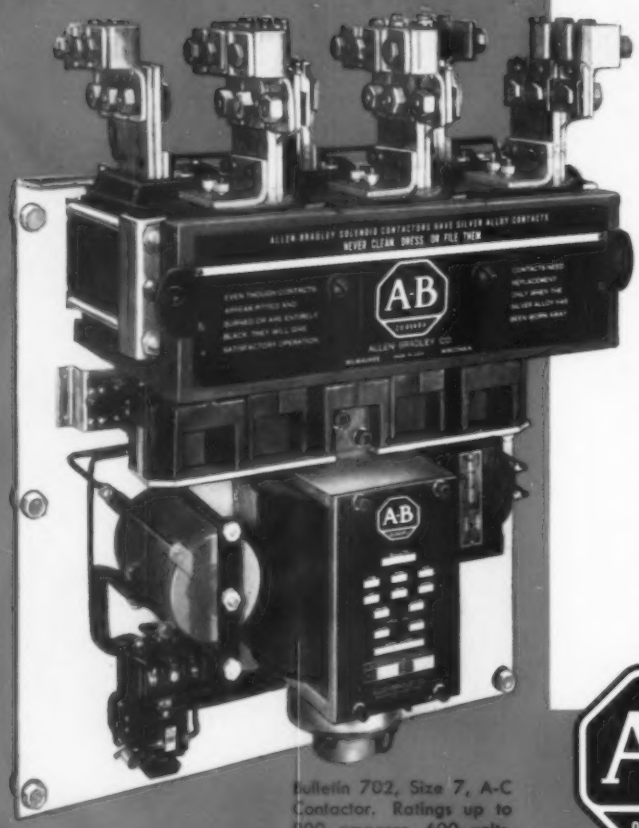
10-58-M

only

ALLEN-BRADLEY gives you Trouble Free Solenoid Starters in ALL SIZES!

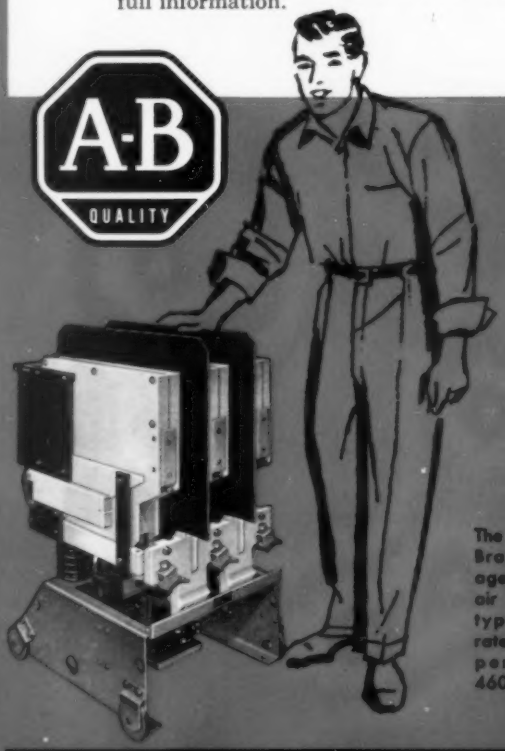
The simple solenoid design—exclusive with Allen-Bradley in the big starter sizes—has only one moving part. This eliminates the trouble causing bearings and flexible jumpers of conventional clapper switches . . . and assures millions of trouble free operations. A-B solenoid starters also have double break, silver alloy contacts that never need any servicing. They are always in perfect operating condition—until the contact is completely used up.

This time-tested solenoid construction is available on *all* Allen-Bradley starters up through Size 7 . . . as well as on A-B's rugged, air break, high voltage starters. Write for full information.

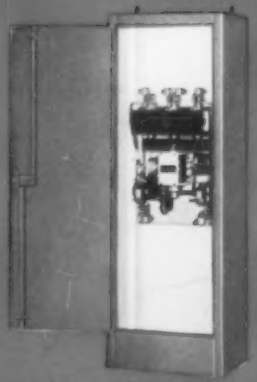


Bulletin 702, Size 7, A-C Contactor. Ratings up to 900 amperes, 600 volts. This basic solenoid contactor is used in large A-B low voltage starters.

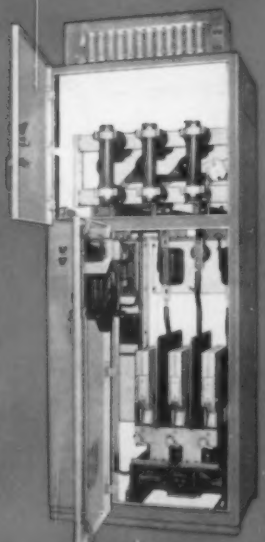
A-B QUALITY



The heart of Allen-Bradley high voltage starters is this air break, solenoid type contactor—rated at 400 amperes, 2300 or 4600 volts.



Bulletin 709 across-the-line solenoid starters are made in ratings to 300 hp, 220 v; 600 hp, 440-550 v.



A-B high voltage starters are built for all types of motors. Ratings to 1500 hp, 2300 v; 2500 hp, 4600 v.

ALLEN-BRADLEY
MOTOR CONTROL
QUALITY

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

10-58-MP

(Begins on page 138)

less costly drawn steel case models. Fields of application are power and steam plants, refrigeration systems, and others where steam, water and non-corrosive oils and gases are principal measured media. A-Line Gages are reported to meet ASA Grade A standards with accuracies within 1 per cent of scale range for the middle half of scale.

To simplify maintenance, socket, tube, tip, movement, dial, and pointer are removable as one unit (except in the 3½-in. dial size). This construction is designed to eliminate pointer shift due to stresses at gage connection, and makes it easy to remove the entire gage internals. United States Gauge Div., American Machine and Metals, Inc.

42—FLOODLIGHT is protected aluminum unit

In the design of the 6050 Series of aluminum floodlights, special attention has been given to an adjustable dial mechanism for wide range focus in any direction, allowing greater selection of beam spreads. A free-

swinging cast aluminum cover ring is incorporated for quick lamp changing. Because of these two practical features, the 6050 Series is suggested for lighting dark, unsymmetrical areas in shipyards, storage depots, warehouses and construction sites. These floodlights have heat-resistant lens, weathertight construction, watertight cord gland for lead-in wiring. They can be used with Mogul base 300- or 500-w incandescent or mercury vapor lamps. Appleton Electric Co.

43—PHONE BOOTH for the noisy locations

The A-12 Shop Booth, an acoustically conditioned intercom or telephone booth, is claimed to cut noise

BOOST PLANT EFFICIENCY WITH

WAYNE HOSE REELS

No suspension cables or coils of loose hose to trip over with Wayne Hose Reels. Operator draws out only the hose length needed, releases it for automatic rewind when finished. Cuts waste motion, lessens worker fatigue, widens work-radius, boosts output efficiency. Saves wear and tear on hose, reduces drop breakage of tools.

There's a Wayne Hose Reel to meet every plant requirement whether for air, oil or water. Write for full details in "Production Booster Hose Reels" to The Wayne Pump Company, Industrial Division, Fort Wayne 4, Indiana. Division of Symington Wayne Corporation.

AUTOMATIC REWIND
POWERFUL SPRING MOTOR
TRIGGER-TYPE ADJUSTMENT
HOSE DIAMETER ¼" TO ½"
HOSE LENGTH TO 50 FEET

Wayne

For more facts circle 581 on Reply Card

NEW IDEAS? I SURE GET PLENTY AT THE POWER SHOW. NO DOUBT ABOUT IT, BILL, I ALWAYS GET A WEALTH OF ENGINEERING INFORMATION BY TALKING TO THE EXHIBITORS' TECHNICAL PERSONNEL. AND THIS IS THE PLACE TO SEE AND COMPARE NEW, COST-SAVING EQUIPMENT.
YES, ED. WE'RE ESPECIALLY CONCERNED RIGHT NOW WITH LOWERING OUR PRODUCTION COSTS, AND SOME OF THE IDEAS I'VE PICKED UP HERE ARE GOING TO HELP DO IT.

YOU, TOO, CAN SECURE VALUABLE NEW IDEAS

at the

23rd National Exposition of POWER & MECHANICAL ENGINEERING

Auspices of ASME

New York Coliseum • Dec. 1-5, 1958

See first-hand the new, cost-saving products of some 300 leading manufacturers—talk to their technical representatives and get the answers to your problems. Be informed on the newest developments, methods and products.

Save time, avoid standing in line, by filling out the coupon below and registering now, by mail!

ASME ANNUAL MEETING

with some 110 technical sessions will be held at the Statler-Hilton and Sheraton-McAlpin Hotels during the same week.

23rd National Exposition of Power & Mechanical Engineering
480 Lexington Avenue, New York 17, N. Y.

Yes, please, send me admission badge at no charge.

Name_____

Title_____

Company_____

Address_____

Type of Products or Business_____

1246

NEW PRODUCTS

(Begins on page 138)

levels 50 per cent. This steel unit contains a perforated steel interior placed over sound absorbing material built into the walls and top, which are 2 in. thick. The booth is finished in gray Hammerloid enamel, has back keyholes and mounting bolts. A telephone cord is in the back shelf. The booth is 28 in. wide, 30 in. high, 23 in. deep. It costs under $80. Suttle Equipment Corp.

44—METAL CONDUIT is flexible and liquid-tight

Sealed Skin, designed to meet J. I. C. requirements, is announced as a liquid-tight flexible metal conduit for waterproof electrical conduit applications, construction, heating and air conditioning equipment, automated lines. Its galvanized steel core, made from continuous strip metal, is covered with polyvinyl chloride to protect against oil, weather, water, dirt, chemicals, fumes and salt spray. Claimed easily installed, even in U-bends or crowded quarters, Sealed Skin is adapted to providing connections between a moving member and stationary part. It can be cut to size on the job and is said to resist vibration. Nine sizes run from $\frac{3}{8}$ to 4 in. The International Metal Hose Co.

To receive product data circle item numbers on the handy Reader Service Cards provided on pages 211-212.

45—COUNTER stops, starts and re-cycles

Tally-Count is a predetermining electronic counter for automatic control of any industrial process involving high-speed counting. It is designed to control "batching," machine cycling, sorting, materials handling, packaging and unit flow at speeds higher than 100 a second. According to manufacturer, Tally-Count offers advantages of electronic counting — accuracy at high speeds, absence of moving parts and of friction—at a price usually associated with mechanical counters. Individual plug-in decades simplify maintenance and permit expansion of Tally-Count from a two-decade to a three- or four-decade counter with no wiring change. Power supply is also a plug-in unit.

Tally-Count may be actuated by relay, photo-electric control, or

JUST NAME IT!

PERMATEX

PERMATEX CAN HELP YOU SEAL IT!

No liquid or chemical is too special for the most famous name in sealants.

The regular lines of Permatex sealants, like the many types of Form-A-Gasket, are staples . . . standard leak-insurance in thousands of plants. But many companies have asked us to meet special and specific needs. The products shown here are the result of laboratory cooperation with industry. The same service is available to any plant with a sealant problem. Your investment in maintenance time and labor is valuable . . . finish the job right with the best . . . by Permatex.

SEALANT 1282: for "hard to hold" chemicals. Insoluble in most chemicals used in industry today. Specially resistant to non-flammable hydraulic fluids. Excellent for use on all types of industrial refrigerants. Brushable black paste, soluble in water, that sets hard. Minus 50° F. to plus 600° F.

SEALANT 1372: high temperature resistance. Used by leading aviation heating equipment manufacturers to seal heating ducts, because it does not produce offensive odors at high temperatures and is vibration resistant. Diester resistant. Black paste, soluble in alcohol, that sets semi-rigid. Minus 50° F. to plus 650° F.

SEALANT 1505: white, can be key-colored. Resistant to aliphatic hydrocarbons such as gasoline, hexane, pentane, etc.; aromatic hydrocarbons such as benzene, toluene, etc. Soluble in alcohol. Minus 60° F. to plus 375° F. A brushable liquid form (Sealant 1520) is available.

SEALANT 1516: oxygen resistant. Formulated specially for oxygen assemblies. Meets all safety requirements for threaded, flat or flanged assemblies. Paste remains pliable. Good vibration resistance. Soluble in perchlorethylene. Minus 65° F. to plus 200° F.

SEALANT 1519: acid, alkali resistant. Resists hot or cold acid, alkali and salt solutions, as well as lower molecular weight alcohols and glycols. Black brushable paste, soluble in toluene, that dries to pliable film. Minus 50° F. to plus 230° F.

SEALANT 572: hydrocarbon resistant. Conforms to MIL-S-7916B. Exceptionally resistant to vibration. Highly recommended for aromatic fuels and lubricants in aviation industry. Black, brushable viscous liquid that sets slowly, forming a flexible plastic film. Minus 65° F. to 400° F.

. . . plus complete lines of job tailored products to keep your equipment producing faster, more safely, with less downtime.

All these Permatex products are readily available at recognized quality industrial distributors.

PERMATEX

COMPANY, INCORPORATED

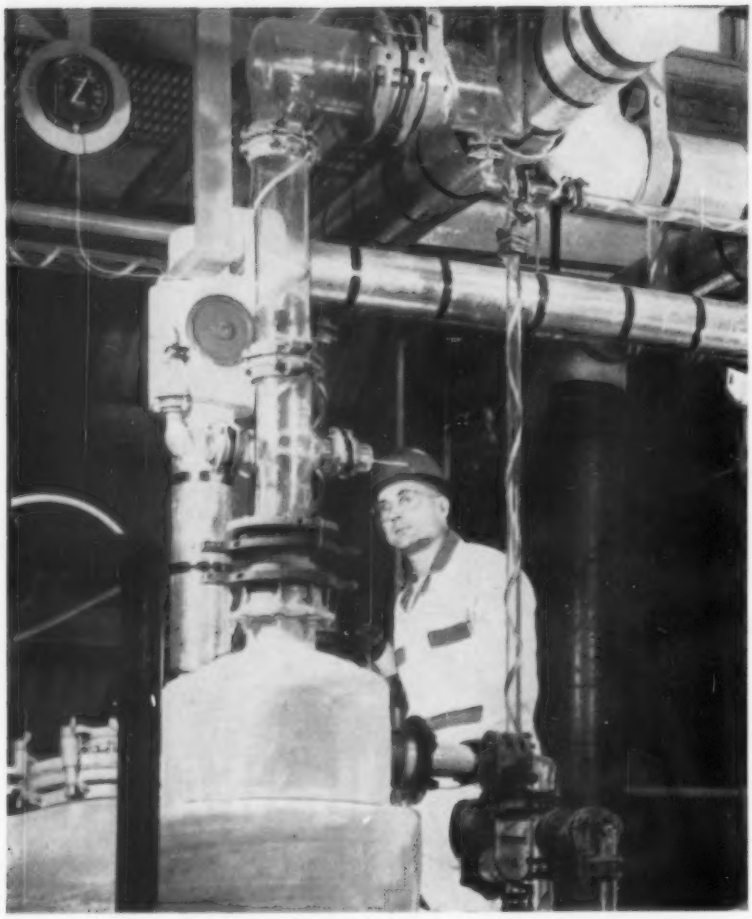
300 Broadway, Huntington Station, L. I., New York

Factories: Brooklyn, N. Y. • Kansas City, Kansas

"There's a Permatex product for every maintenance need"

SEALANTS • ADHESIVES • LUBRICANTS

For more facts circle 583 on Reply Card



Raw ether runs through these PYREX Pipes at a Baker & Adamson plant without a trace of corrosion or product contamination.

Between this man and a highly volatile chemical lie only PYREX® Pipe and confidence

At this ether distillation operation in a Baker & Adamson plant precaution is the password; you can see it in the hat, the gloves, the static ground wrappings on the pipe . . . *and the pipe itself.*

The pipe is strong. You can't take chances with pure ether. "Double-Tough" PYREX Pipe is made to take pressure and heat and a goodly amount of mechanical abuse.

The pipe cannot corrode. Not from ether or from any other chemical but hydrofluoric acid and hot alkalies.

The pipe cannot contaminate. It's completely inert—vital when you're making an A.C.S. Reagent Grade chemical.

And the pipe is transparent. You can see what's going on inside PYREX Pipe. Maintenance men can judge its condition at all times just by looking. Should a blocking occur they can spot it exactly and ascertain its nature *without* opening the pipe.

Such remarkable features should certainly induce you to learn more about this remarkable pipe by writing to us for Bulletin PE-3.

CORNING GLASS WORKS
10-10 Crystal Street, Corning, New York
Corning means research in Glass

For more facts circle 584 on Reply Card

NEW PRODUCTS

(Begins on page 138)

switch. Counting capacity of a four-decade Tally-Count (as a predetermining counter) is 10,000. As a totalizing counter, with four decades and four-digit mechanical register, counting capacity is 1,000,000. A three-decade Tally-Count costs around $300, individual decades $50. Standard Instrument Corp.

46—CONVEYOR ROLLER removes easily without tool

"Spring-O-matic" axle construction to permit easy insertion or removal of the roller from the frame is a feature of the No. 138 Roller. For positioning it in conveyor frame, the

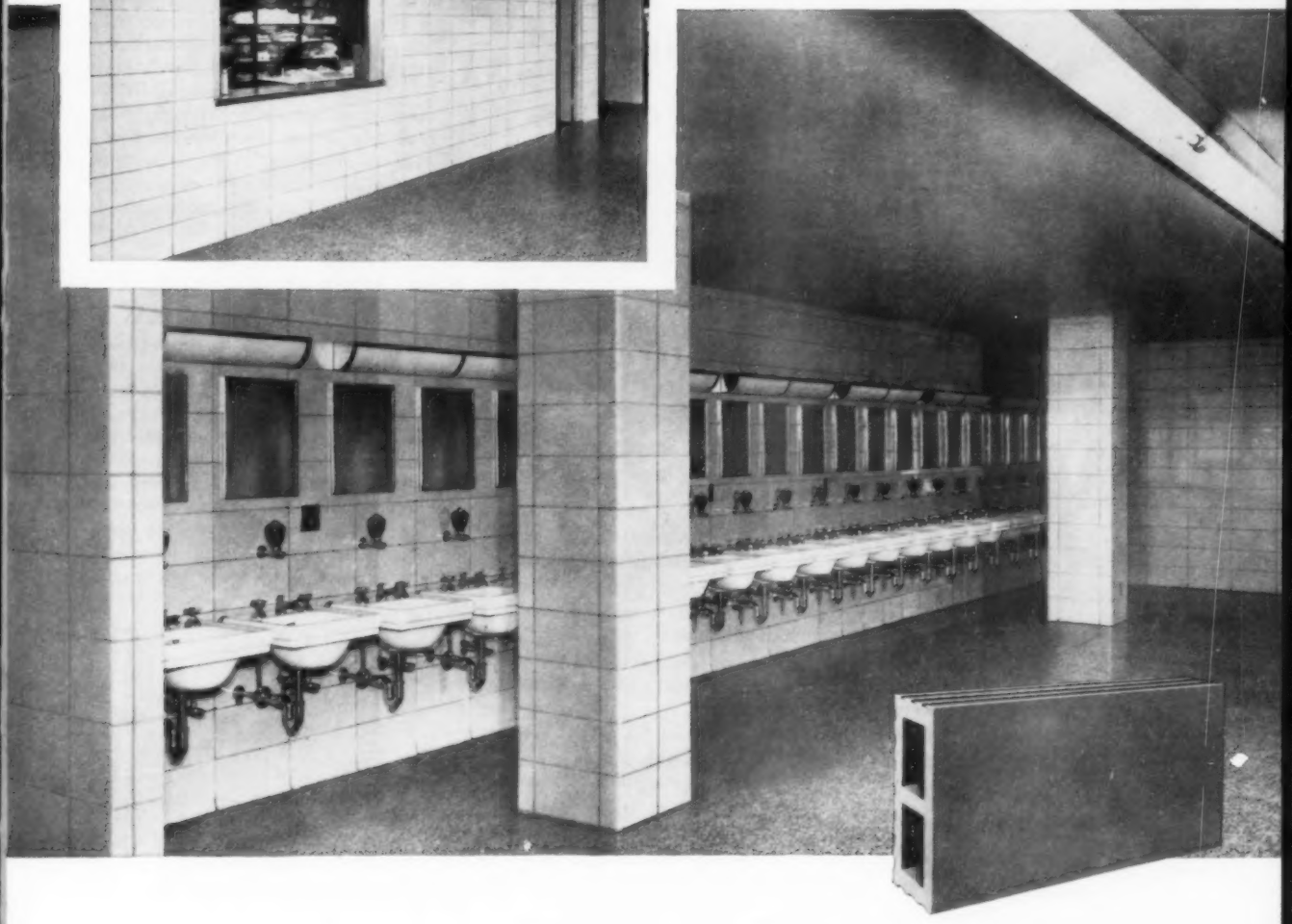
shaft end is manually depressed; spring loaded, it snaps into the axle hole of the frame, ready for operation. This construction also permits removal of rollers without tools, company notes. The roller, which turns on an integral ball bearing, is 1⅜ in. in diameter, with 18-gage steel wall and is rated at 80-lb capacity. The E. W. Buschman Co.

47—CIRCUIT BREAKERS provide space savings

These two molded-case circuit breakers are described as providing 225-and 400-amp continuous-current rating in two-thirds the space formerly required. Designated JK and JKL, these breakers provide on a small J-frame the protection previously available on larger K and KL frames, manufacturer states, and at the same or lower costs. They come in both two- and three-pole models with interrupting ratings of 25,000 amp at 600 v. a-c. They are announced as UL approved and as offering features and advantages of company's entire molded-case line plus two new ones for this breaker size range.

First of these features is interchangeable thermal-magnetic trip units which can be set at five different instantaneous trip valves and may be adjusted from front panel after breaker installation. The second advantage is a front-removal lug

Natco "8W" Series Ceramic Glaze Vitritile in "block-bond" construction at the new washroom and entranceway of the H. J. Heinz Company Service Building in Pittsburgh, Pa. Natco Vitritile is manufactured in a complete line of shapes and fittings to meet all construction requirements, including 2-inch soaps for attractive facing of existing walls.



In new construction or modernization, *NATCO Ceramic Glaze Vitritile Interiors are clean, colorful, permanent*

Attractive, maintenance-free interiors of Natco Ceramic Glaze Vitritile will give you the answer to really modern industrial washrooms.

Natco Vitritile is fireproof, resistant to physical and chemical damage and has an impervious finish that makes it an ideal material where sanitation and cleanliness are important.

Furnished in a complete range of functional and decorative colors, Natco Vitritile offers the owner almost unlimited opportunities for outstanding interiors.

Finally, Natco Ceramic Glaze Vitritile saves money because it is a structural unit with an interior finish that can be installed in one operation . . . at one cost.

Find out all the advantages of building or modernizing with Natco now by writing for general catalog S-58. For detailed information on Natco Ceramic Glaze Vitritile write for color chart CC-57 and the shape catalogs listed at right.

SIZES AND SHAPES

Series	Shape Catalogs	Tile Face Size	Nominal Thickness
"8W"	8W-257	7¾" x 15¾"	2", 4"
"6T"	6T-657	5⅛" x 11¾"	2", 4", 6", 8"
"4D"	4D-1255	5⅛" x 7¾"	2", 4", 6", 8"

NATCO
CORPORATION

GENERAL OFFICES: 327 Fifth Avenue, Pittsburgh 22, Pa.

BRANCH SALES OFFICES: Boston • Chicago • Detroit New York • Philadelphia • Pittsburgh • Syracuse • Birmingham, Alabama • Brazil, Indiana

IN CANADA: Natco Clay Products Ltd., Toronto 5, Ontario

FTI STRUCTURAL

NATCO QUALITY CLAY PRODUCTS SINCE 1889

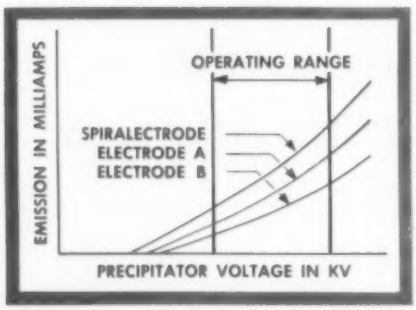
For more facts circle 585 on Reply Card

1500 miles of Spiralectrodes in Precipitator Service!

That's real proof of superior performance. Over 1500 miles of these emitting electrodes have been installed in 'SF' electric precipitators . . . delivering 50 to 100% more electron emission than conventional types of electrodes.

There are sound reasons why Buell *Spiralectrodes* are providing superior emitting efficiency in actual dust collecting applications.

- *Spiralectrodes* are *"emission engineered"* – pitch and diameter are custom designed for each application . . . of critical importance with high resistivity dust.
- *Spiralectrodes are precision made from stainless steel*– of uniform quality, corrosion-resistant.
- *Spiralectrodes minimize efficiency-loss of dust build-up* –no horizontal surface to collect dust, positive rapping cleans electrodes.
- *Spiralectrodes maintain predetermined tension* – (no weights required) . . . dampen effect of vibration caused by electrical pulsation, thereby minimizing electrode breakage.
- *Spiralectrodes*' controlled area emission stops sparking effect of "point emission."



Above chart illustrates the superior emission of the Spiralectrode: its corona voltage is lower and its emission is higher than other types of emitting electrodes over the entire operating range of industrial precipitator voltage.

The superior operating characteristics of Spiralectrodes contribute to continued high efficiency of Buell 'SF' Precipitators. Detailed information of this and other exclusive features are described in a booklet, "Buell 'SF' Electric Precipitators." Send for your copy: write Dept. 14-J, Buell Engineering Company, Inc., 123 William Street, New York 38, New York.

buell®

Experts at delivering Extra Efficiency in

DUST COLLECTION SYSTEMS

For more facts circle 586 on Reply Card

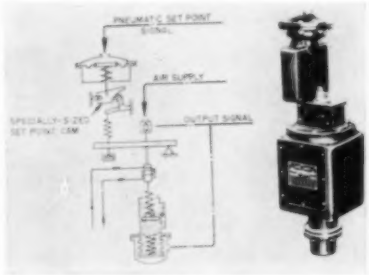
NEW PRODUCTS

(Begins on page 138)

design for fast, simple interchange of trip units after the breaker has been installed. These breakers are quick-make-and-break and trip free, says company, and all poles open simultaneously through common trip action when overload occurs on any pole. A three-position handle indicates if breaker is on, off or tripped. Terminals are enclosed. I-T-E Circuit Breaker Co.

48—REGULATOR controls current to a-c motors

For measuring and controlling current to a-c motors and circuits, this company's Motor Load Regulator now comes with a selection of specially sized cams for automatic set point adjustment. The electro-pneumatic controller can be adapted for current measurement and transmission or automatic control with reset action. By measuring and converting current flow to a pneumatic



signal, advantages of pneumatic instrumentation are retained. Applications include motor driven compressors, blowers, others with motor drives from 5 to 10,000 hp.

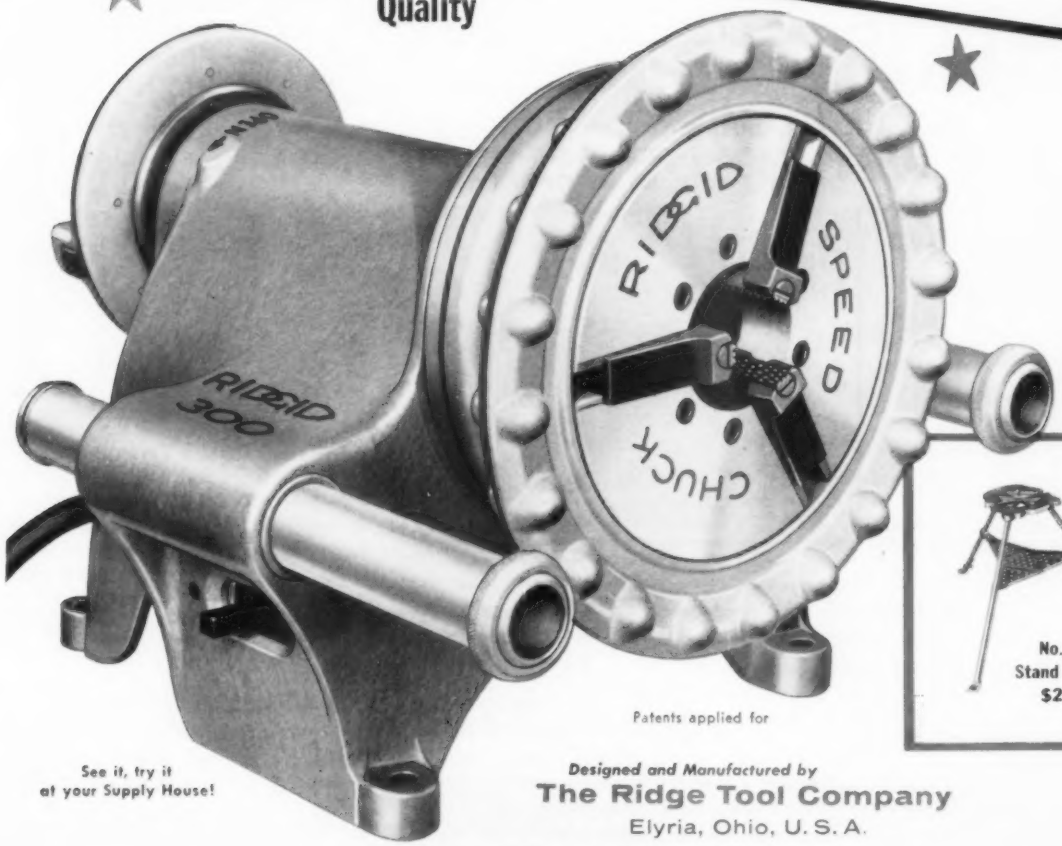
As a controller, set point can be established locally by manual adjustment or remotely by automatic pneumatic adjustment. Any variation in set point (or pressure signal from a master controller) causes the motor load regulator to increase or decrease process load on motor. In such control applications where automatic set point adjustment is employed, the cam in the set point can match process characteristics.

When used for current measurement, the pneumatic output is a 0-30 psi signal. A typical current limiting application is protection of high powered motors against process surge overloads. The instrument is a nominal 5 amp device with application characteristics similar to overcurrent relays. Accuracy is giv-

Introducing... the ALL NEW RIDGID 300 Power Drive

- Full 1/8″ to 2″ capacity
- Light-Weight • Heavy-Duty
- Unmatched RIDGID Quality

$199.50



No. 1206
Stand Available
$27.00

Patents applied for

See it, try it
at your Supply House!

Designed and Manufactured by
The Ridge Tool Company
Elyria, Ohio, U.S.A.

For more facts circle 587 on Reply Card

COST REDUCTION* AND INCREASED PERFORMANCE

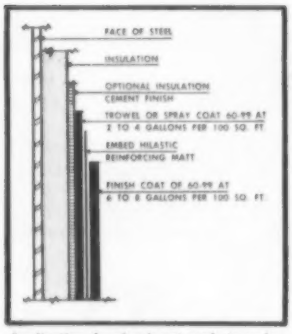
with *hi LASTIC* mastic and matt for Thermal Insulation Protection

REDUCE

1. DRIED FILM THICKNESS
2. MASTIC APPLICATION COST
   (HiLastic—first fibrated emulsion mastic suitable for spray application)
3. RE-INFORCING MEMBRANE APPLICATION COST
   (HiLastic Matt . . . flexible and easily imbedded. No re-inforcing imprint.)

INCREASE

1. FLEXIBILITY
   Eliminates expansion cracks
2. RESISTANCE TO PHYSICAL ABUSE
   New concept of flexible reinforcing membrane gives added strength to mastic film.
3. DURABILITY
   Weathering resistance improved with less film thickness.


FACE OF STEEL
INSULATION
OPTIONAL INSULATION CEMENT FINISH
TROWEL OR SPRAY COAT 60-99 AT 2 TO 4 GALLONS PER 100 SQ. FT.
EMBED HILASTIC REINFORCING MATT
FINISH COAT OF 60-99 AT 6 TO 8 GALLONS PER 100 SQ. FT.

Application drawing is not made to scale.

HERE'S HOW

HERE'S RESULT

Foster HiLastic Mastic and Matt as applied to tower at The Mead Corporation plant, Chillicothe, Ohio.

*Actual job figures available with insulation contractors indicate 25% to 35% reduction in cost of applied mastic finish.

foster COATINGS • SEALERS • ADHESIVES for thermal insulation

BENJAMIN foster CO.
Division of Amchem Products, Inc.
4635 W. GIRARD AVE. • PHILA. 31, PA.

SOLD BY AMERICA'S LEADING INSULATION DISTRIBUTORS AND CONTRACTORS

For more facts circle 588 on Reply Card

NEW PRODUCTS

(Begins on page 138)

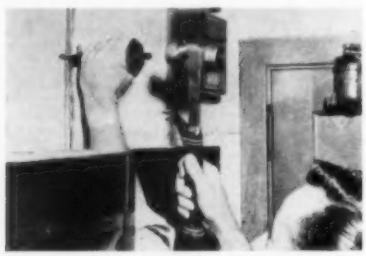
en as ± 0.1 amp and repeatability better than 0.05 amp. Hagan Chemicals & Controls, Inc.

49—HELICAL GEAR DRIVES in capacities to 200 hp

Larger sizes of double and triple reduction drives and a quadruple reduction helical gear drive have been added to this company's In-Line Helical Gear Drives. Capacities to more than 200 hp are available. The compact quadruple reduction speed reducer, in five sizes, extends the range of ratios as high as 2,217 to 1. The simple gear arrangement of these speed reducers consists of helical gear trains operating in high capacity ball and roller bearings in a cast iron housing. Space requirements are minimized by locating input and output shafts in the same horizontal and vertical planes. Automatic splash lubrication of moving parts is provided. Folder 2651A gives complete data. Link-Belt Co.

50—FASTENING TOOL speeds most fastening jobs

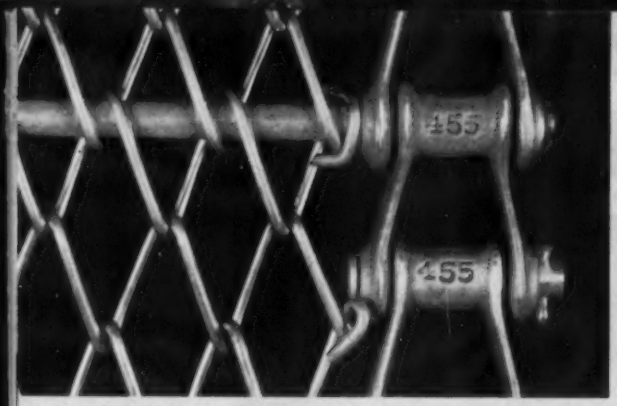
This fastening tool is reported to have reduced fastening time in telephone installations by 50 per cent. Called the R-260, it is of manufacturer's Shure-Set type and utilizes



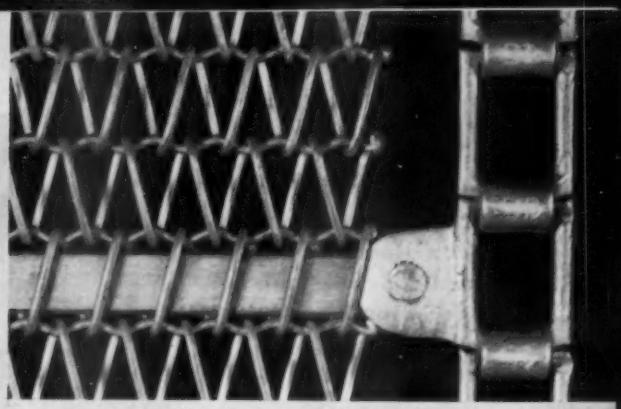
the power of a swung hammer to drive studs into a variety of non-brittle surfaces and light gage metal. The tool is also claimed simple to operate, having only four moving parts. It is supplied with a drill holder for drilling holes manually, wherever necessary, with the same tool. Ramset Fastening System, Olin Mathieson Chemical Corp.

51—COATING affords protection against rust

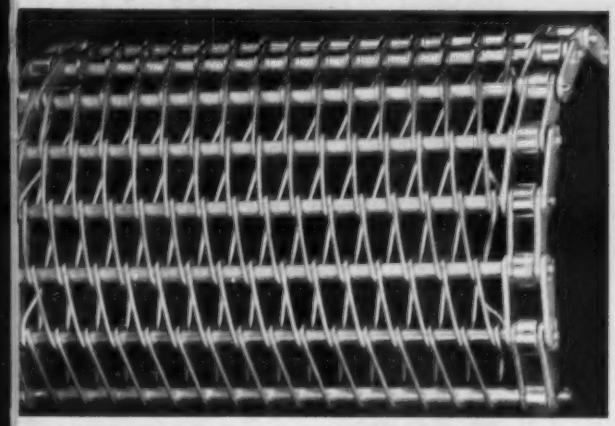
Long-lasting rust prevention at lower cost is announced for Arrust, a fish oil penetrating coating fortified with a rust inhibitor. It is



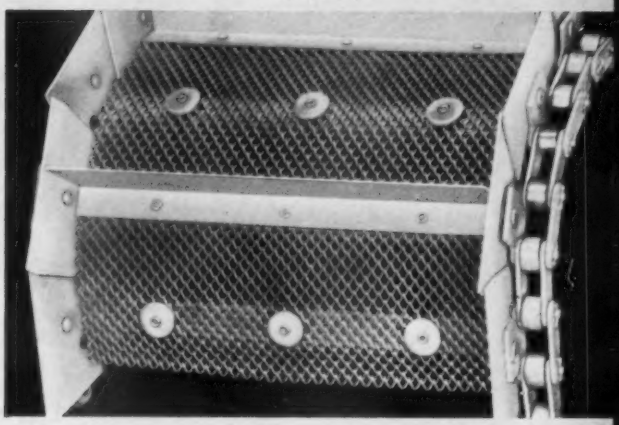
Wissco Pintle Type Chain Edge
For medium and heavy load operations where flexibility is paramount.



Wissco Detachable Chain Edge
Found to be most economical of the positive drive attachments and most satisfactory for conveyors carrying light to medium loads.



Wissco Extended Pitch Chain Edge with oversize rollers
Can be adapted to any type belt where positive drive is required. Provides precision operation, longer, more economical service.



Wissco Quench Tank Belt
This medium weight belt is equipped with extended pitch roller chain, plate-type Guardedge and angle flights.

WISSCO chain edge BELTS

. . . . *"tailored" to positive-drive requirements*

Wherever positive drive belts serve best . . . in food processing, materials handling, quench tank, baking, washing, degreasing installations, or machinery or parts processing . . . Wissco Chain Edge Belts are preferred. They pay dividends—in the exceptionally long, trouble-free service life they ensure under normal conditions, and in the freedom from costly, troublesome side travel that they provide.

Within certain dimensional limitations, Wissco Chain Edge Belts, in either Balanced Spiral or Conventional weave constructions, can be furnished with any type link or roller chain. Positively-driven side chains, or side and intermediate chain constructions, are furnished in accordance with individual requirements. To determine which fabric, side chain arrangement and method of support will provide best results, an analysis of specific service requirements is best. We'll be glad to have a Wissco representative call, and to have our engineering department provide detailed drawings and recommendations, without obligation, or to supply you with further information on Wissco Chain Edge Belts. Just fill in the coupon below indicating the service you wish.

6345

CF&I WISSCO BELTS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION • Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION • Atlanta • Boston • Buffalo • Chicago
Detroit • New Orleans • New York • Philadelphia
CF&I OFFICE IN CANADA: Montreal

For more facts circle 589 on Reply Card

Advertising Department
The Colorado Fuel and Iron Corporation
575 Madison Avenue, New York 22, N. Y.

☐ Please send me, without delay, your new folder describing Wissco Chain Edge Belts.

☐ Please have a Wissco salesman phone me for an appointment.

NAME_____

TITLE_____

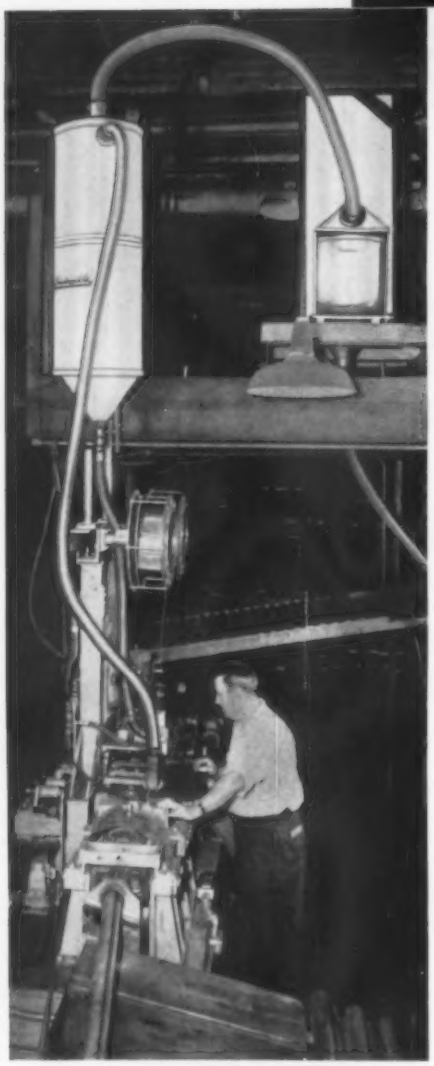
COMPANY_____

STREET_____

CITY_____ ZONE____ STATE_____

Savings in reclaimed flux alone have paid for Invincible units in a few months, or even weeks, on submerged arc welding jobs.

INVINCIBLE
Welding Flux Recovery Systems
MAKE 3-WAY SAVINGS



Operating continuously, this Invincible recovers all unfused flux from pipe-seam welding operation at a leading automotive firm.

1 *Valuable Flux Reclaimed. Automatic* Invincibles recover *all* unfused flux and return slag-free, dust-free usable flux to the welder—*all in one continuous operation.*

2 *Costly Man-Hours Saved.* Invincibles do the complete job automatically—far more swiftly and efficiently than manual methods.

3 *Fewer Expensive Rejects.* Invincibles remove all fine dust (flux flour), thus reducing welding rejects and speeding production.

Many Important Advantages

- Ruggedly built to resist abrasive nature of flux.
- Compact and lightweight. Variety of models and flexibility eliminate need for tailor-made installations.
- Portable units also available.

WRITE TODAY FOR FOLDER on Invincible Flux Recovery Systems.

INVINCIBLE VACUUM CLEANER MFG. CO.
DOVER, OHIO

For more facts circle 590 on Reply Card

NEW PRODUCTS

(Begins on page 138)

described as easy to apply and suggested for use on all rusted or rustable metals. Manufacturer says it can be used directly over firm rusted surfaces without peeling or flaking, and acts as both a prime and finish coat. Except for severely rusted surfaces, only one coat is necessary. According to manufacturer, Arrust stops rust by penetrating and combining with oxidized material to form an impervious, elastic coating. It is also reported resistant to moisture, atmospheric conditions, acids, oils and most chemicals. It comes in red or black. A gallon covers about 300 to 400 sq ft. Arted Co.

52—SPEED REDUCERS with mounting flexibility

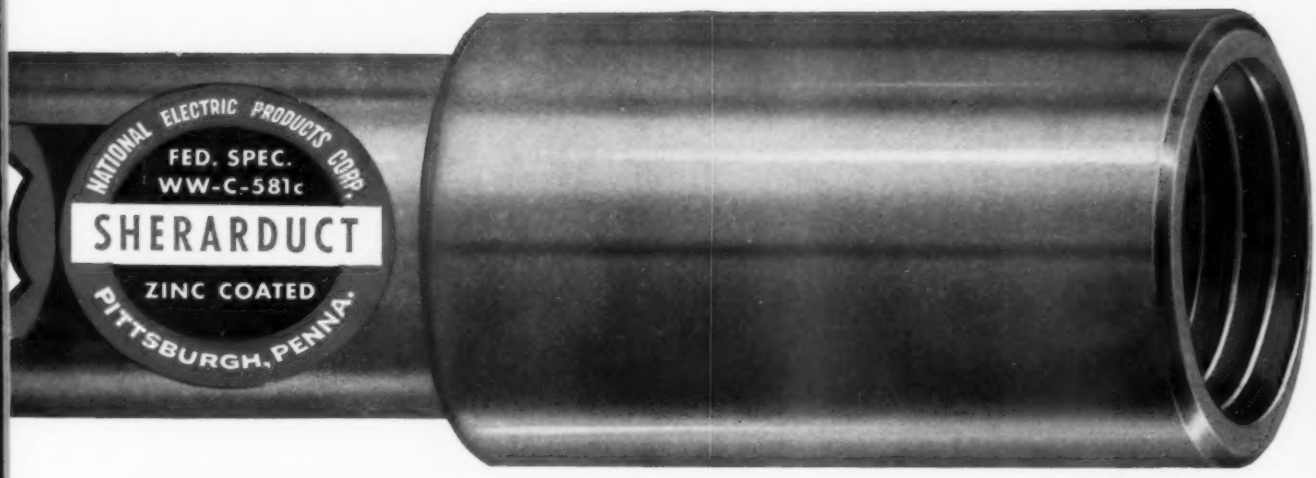
In the Optimount series of helical-geared speed reducers, stock models of standardized unit, for shaft mounting or base mounted meet virtually all drive requirements. The series features a basic unit, with either single or double reduction helical gearing, which can be mounted directly on driven shaft or mounted in stock horizontal or vertical bases. Four sizes of the basic units provide output speeds of 10 to 431 rpm, and capacities of 1/6 to 15 hp. Basic units come in three types. Optimount Reductors are designed for V-belt, sprocket or gear drive to input shaft. Optimount Ratiomotors provide direct motor drive to input shaft. Optimount Flanged Reductors are the Optimount Ratiomotor units sold without motor, ready for attaching your motor. Boston Gear Works.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 211-212.

53—PLASTIC FIBER for filter media support

Applications of Trilok are primarily as a filter media support and drainage member for wet process filters. The smooth surface, as compared to conventional coarse woven wire or perforated plate, is claimed to increase filter media life and eliminate need for undercovers, even with the lightest media. The honeycomb structure gives good hydraulic flow

HERE'S *double* PROTECTION



NOW galvanized Sherarduct is coated with NEW

FORMULA MVC-1

the modified vinyl copolymer that provides the most effective barrier against corrosive agents of all kinds

National Electric has developed a new way to combat conduit corrosion. It is called Formula MVC-1, a new modified polyvinyl chloride resin coating that's available only from National Electric.

Here's what MVC-1 does to even further increase the protection against corrosion offered by the Sherardizing process of galvanizing.

RESISTANCE TO CORROSIVE ATTACKS—In accelerated salt spray, sulphuric acid and caustic tests conducted by the Pittsburgh Testing Laboratories, new Sherarduct with Formula MVC-1 far outlasted all hot dipped and other high-grade coated and galvanized conduits tested.

RESISTANCE TO FLAKING—Formula MVC-1 makes a tight, uniform, adhesive coating that withstands bending without cracking or flaking.

TEMPERATURE RESISTANCE—Formula MVC-1 is extremely resistant to high and low ambient temperatures and will withstand the majority of all industrial temperature conditions.

NOW ADD THIS NEW CORROSION RESISTANCE TO SHERARDUCT'S OTHER FEATURES

1. The Sherardizing process of galvanizing that alloys zinc with the conduit walls.
2. Normalized, highly ductile steel for easy bending and threading.
3. Zinc protected threads for complete end-to-end protection.

These are the features that convince architects, engineers and contractors it is best to specify National Electric Sherarduct when real corrosion protection is required. Write for complete information on new Sherarduct today.

Listed by Underwriters' Laboratories, Inc.

Sherarduct *with MVC-1* **is Galvanized Conduit at Its Best**

National Electric Products Corp.

PITTSBURGH 22, PENNSYLVANIA

SALES OFFICES LISTED UNDER

Bennett Associates, Inc.

Sales Offices and Warehouses in Principal Cities

For more facts circle 591 on Reply Card

Self-propelled Diesel Air Compressor does all kinds of plant maintenance work . . .

OPERATING AIR TOOLS. 125 cfm instantly available for every compressed air need.

LOADING MATERIALS. Full cubic yard bucket handles heaped loads up to 4000 lbs.

The Schramm 125 cfm Heavy Pneumatractor can do all types of maintenance jobs in your plant that call for a tractor or compressor. It's a self-propelled air compression plant *and* a wheel tractor—converting instantly from one to the other, right from the instrument panel. No trucks. No towing. No wasted manpower. One man drives *and* operates the Pneumatractor.

Provides extra air—the Heavy Pneumatractor supplies a full 125 cfm of air for operating *extra* tools.

Multipurpose—versatile Pneumatractors shovel, load, trench, dig, grade, backfill, hoist, haul, sweep, pump, spray paint. You name it, they do it!

Cost far less—Pneumatractors save you the expense of a tractor and other special purpose machines. Easily serviced by any engine mechanic.

Save time—no delays; no crews tied up. Pneumatractors *drive* to the job—start work at once.

Diesel or gasoline powered—to suit your exact need and give you maximum economy.

Safer—no fuel hazard. Write for information.

See the Yellow Pages for local Sales, Service and Rental of Schramm Air Compressors.

Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS

665 North Garfield Ave. • West Chester, Pa.

For more facts circle 592 on Reply Card

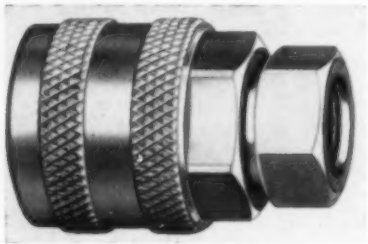
NEW PRODUCTS

(Begins on page 138)

of filtered liquid. Woven from saran and polyethylene fiber, Trilok has the inherent corrosion resistance of these two plastics, as well as good resistance to and recovery from compression. Other possible applications include use as spacers in envelope type dust collectors, as mist eliminators or entrainment separators in vacuum towers, distillation equipment, gas absorbers, scrubbers, evaporators, where temperatures are moderate, corrosion severe. The National Filter Media Corp.

54—AIR COUPLERS designed for fast action

Air couplers in the new Flex-O-Matic line are reported to be lighter in weight and to provide a fast, efficient means of connecting an air hose to lubricating equipment or other air-operated devices. Also, a large air passage affords increased air flow. Details in Catalog 65. Lincoln Engineering Co.



55—FLOOR COVERING is both resilient, non-slip

Scotch-Tred is flexible enough to be bent double, yet tests are reported to show that it outwears most popular floor coverings. It is suggested for walks, stairs and ladders; in locker rooms and showers; at the maintenance bench. Scotch-Tred can be applied in minutes, it is pointed out, and is ready for immediate use. You simply strip the protective backliner from the pressure-sensitive adhesive and press to a clean, dry surface. It is made with a dimensionally stable plastic film backing, waterproof adhesive and bonded-particle surface and weighs only 2½ oz per square foot, has a maximum thickness of 50 mils.

Although primarily a floor covering Scotch-Tred can be used to protect walls subject to marring or impact damage, and to provide a sure-grip for tool handles. Conveyor

Help Yourself

to useful data on UPVC PIPING

These authoritative bulletins provide valuable reference data on **ttp** products—where and how to use them in the fight against corrosion. Check coupon and mail.

1 LIGHT WEIGHT FITTINGS. How they cut your costs. Includes dimensions of all types and sizes to 4".

2 CORROSION RESISTANCE CHART. Compares corrosion-resisting piping materials for handling all chemicals.

3 PVC PIPE FITTINGS, FLANGES and VALVES. A comprehensive data book on these piping products . . . applications . . . advantages . . . properties . . . installation procedures . . . operating pressures.

4 UPVC LINED PIPING SYSTEMS. Describes fittings, flanges, pipe of metal systems with UPVC lining for corrosive fluids with increased pressure-temperature limits.

Leading Manufacturer of Injection Molded Unplasticized Polyvinyl Chloride Pipe Fittings, Flanges and Valves.

TUBE TURNS PLASTICS, INC.

2929 Magazine Street • Louisville 11, Kentucky

5 DIAPHRAGM VALVES. Features, applications, dimensions of this line of Grinnell-Saunders UPVC diaphragm valves.

6 PLUG VALVES. Application and advantages of self-lubricated UPVC plug valves.

7 LIFT CHECK VALVES. Key to long, trouble-free service. Describes. Gives dimensions.

8 SOLVENT CEMENT. Tells how to use to simplify installation of UPVC piping.

9 THREAD LUBRICANT. How to use to speed assembly of threaded joints.

TUBE TURNS PLASTICS, INC., Dept. PE-10
2929 Magazine Street, Louisville 11, Kentucky

Send free reference material indicated by numbers I have checked.

1 2 3 4 5 6 7 8 9

Company Name _____

Company Address _____

City _____ Zone ____ State _____

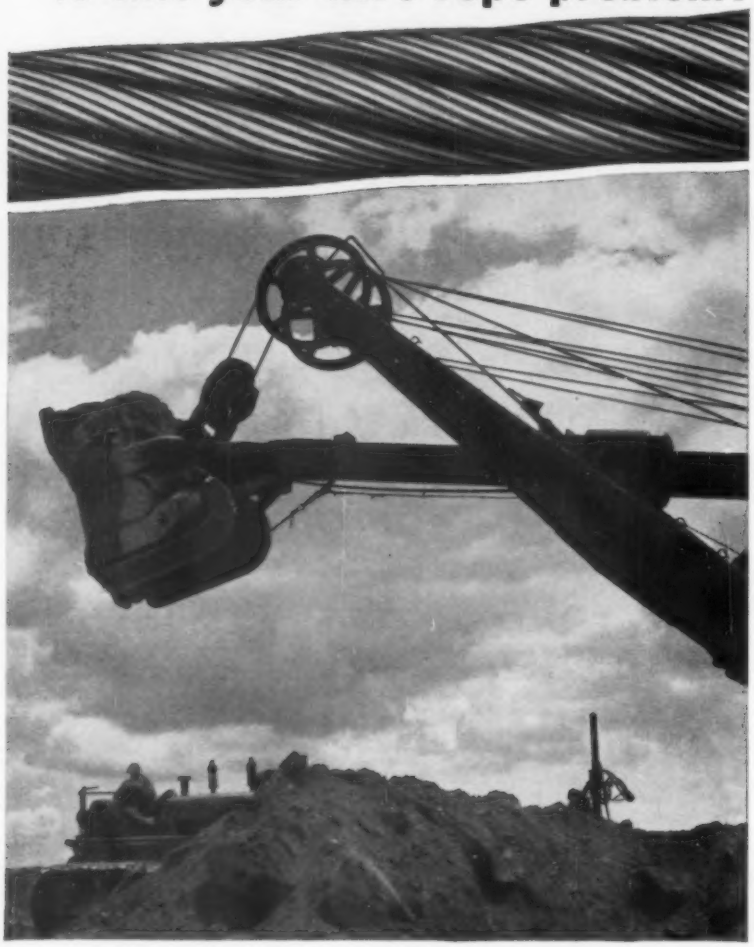
Your Name _____

Position _____

For more facts circle 593 on Reply Card

bending fatigue...

is this your wire rope problem?



FREE Red-Strand Service Bulletin No. 105 brings you the answer you're after!

Do broken wires start showing up much too soon after you put a new wire rope into use? If so, costly bending fatigue is probably the explanation. Fortunately much of the expense it causes can be eliminated by following the simple procedures explained in Red-Strand Wire Rope Service Bulletin No. 105. This is one of a series devised to help wire rope users get better service without spending more money. Copies are sent on request. Write H. K. Porter Company, Inc.—Leschen Wire Rope Division, St. Louis 12, Mo.

LESCHEN
Red-Strand
WIRE ROPE

H. K. PORTER COMPANY, INC.
LESCHEN WIRE ROPE DIVISION

For more facts circle 594 on Reply Card

NEW PRODUCTS

(Begins on page 138)

belts can be stripped crosswise with it to gain additional non-marring traction and it is usable as pulley lagging. It is available in beige, black and gray in 96-ft rolls 4 to 36 in. wide, also in ¾-by-24 in. strips and in 9-by-9 in. tiles. Custom shapes can be ordered. A sample is offered. Minnesota Mining and Manufacturing Co.

56—PLASTIC BODY VALVE has more corrosion resistance

Tests of the Fig. 8, a plastic body valve, with some corrosives used in the paper, chemical processing and petroleum industries, are reported to show it more corrosion resistant than stainless steel valves. The plastic costs less than stainless steel, it is stated, and substantially less than alloys with comparative corrosion resistance. The plastic body of this valve is glass-reinforced with high impact polyester resin; it is claimed to be vibration proof, to resist acids and alkalis, to withstand 150 psi and 300 F.

The valve is bonnetless and comes in sizes from 3 to 12 in. It is reported especially serviceable in pulp and paper or chemical process stock lines, caking type or crystalline sludges. Catalog 420 gives data. W. G. Rovang & Associates, Inc.

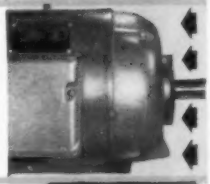
57—VACUUM CLEANER with big capacity tank

Model 75 Turbo-Vac is a full-time vacuum and blower with tank capacity of 1⅔ bu or 10 gal. It is equipped with an auto-lift which, by a touch of the foot, releases the container immediately. The tank is seamless heavy gage steel with an interior lining. Model 75 has a 1-hp by-pass motor in a removable power unit, which can be used in combination with manufacturer's new Drum-Seal for use in extra capacity boiler operations. Other features included tricycle mounting, with two 12-in. ball bearing mounted wheels and a ball bearing swivel caster in front. The by-pass motor is cooled by a separate current of air, and is protected against dust

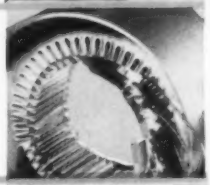
NEW R&M Re-Rated Series 254U All-Weather Motors

"straight through" dual-sweep ventilation eliminates "hot spots"

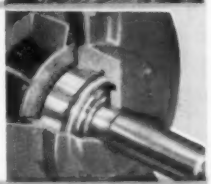
full height end head protection



Mylar insulation increases motor life*



bearings easily inspected by removing cover plate



permanently numbered leads simplify installation and maintenance

*DuPont registered trademark.

Premium Performance

. . . at standard motor prices

R&M Series 254U Motors help pay their own way from the minute you flip the switch! They stoutly resist any hostile environment—moisture, dirt, heat, acid or alkaline fumes—and so live longer. They have push-pull ventilation that won't let dirt settle and keeps motor internally cool—and so perform with full, brisk efficiency. Their oversize bearings are quick and easy to inspect and relubricate—so your maintenance costs dwindle.

This long, trouble-free, vigorous motor life is what R&M means by "Premium Performance"—an extra reward in service and savings every R&M motor offers. These and other big, money-saving advantages shown at left cost no more . . . R&M motors carry standard motor prices!

Write today for R&M Bulletin 520-PE!

Robbins & Myers build motors from 1/200 to 200 horsepower

ROBBINS & MYERS, INC.

SPRINGFIELD, OHIO | BRANTFORD, ONTARIO

R&M

For more facts circle 595 on Reply Card

You can do these 40 fastening jobs faster at less cost

. . . just mail this ad

Here are 40 important plant maintenance jobs that you can do faster, better and cheaper with just ONE PAIR OF TOOLS . . . RAMSET® DUO-JOBMASTER® for heavy-duty fastening to concrete and steel and SHURE-SET® for light-duty jobs in concrete and building block. Simple, lightweight tools . . . no drilling, bolting or plugging . . . no power lines, no bulky equipment.

Check off the jobs that interest you, fill out the information below and mail this ad! We'll rush data on how the RAMSET FASTENING SYSTEM can solve your fastening problems. We'll also itemize the more than 60 other jobs these tools can handle.

- ☐ Wood sleepers to concrete.
- ☐ Wood furring to concrete and steel.
- ☐ Cafeteria stools.
- ☐ Wood or metal floor and ceiling channel for partitions.
- ☐ Toilet partitions.
- ☐ Steel shelving.
- ☐ Conveyors.
- ☐ Fire extinguisher racks.
- ☐ Steel floors.
- ☐ Overhead-door installation.
- ☐ Wire mesh.
- ☐ Waste lines.
- ☐ Cork insulation board, etc.
- ☐ Wood to steel lintels.
- ☐ Door bucks.
- ☐ Conduit straps or hangers to concrete.
- ☐ Outlet, junction and switch boxes.
- ☐ Bus ducts.
- ☐ Interplant communication systems.
- ☐ Wiremold.
- ☐ Metal flashings to concrete and mortar joints.
- ☐ Gunite applications.
- ☐ Unistrut sections to concrete and steel.
- ☐ Anchors for false-ceiling suspension.
- ☐ Baseboard heating brackets.
- ☐ Water, steam and sprinkler pipe hangers.
- ☐ Metal rod hangers.
- ☐ Air-conditioning ducts.
- ☐ Exhaust ducts.
- ☐ Electric motors to concrete.
- ☐ Light machinery to concrete.
- ☐ Tool racks to concrete or steel.
- ☐ Steel flooring to concrete.
- ☐ Traffic and other signs to steel and concrete poles and walls.
- ☐ Name plates to steel and machinery.
- ☐ Underfloor electrical raceways.
- ☐ Fan and blower mounts.
- ☐ Metal lath.
- ☐ Corrugated siding to girts and purlins.
- ☐ Heating ducts.

Name_____

Company_____

Address_____

City_____ Zone_____ State_____

Your Position_____

Shure-Set Trademark
HAMMER-IN FASTENING TOOLS
PATENTS PENDING
BY THE MAKERS OF Ramset® PRODUCTS

Ramset Fastening System
WINCHESTER-WESTERN DIVISION
OLIN MATHIESON CHEMICAL CORPORATION

12133-J BEREA ROAD CLEVELAND 11, OHIO

For more facts circle 596 on Reply Card

NEW PRODUCTS

(Begins on page 138)

and water. The filter of this machine has an area of 1100 sq in., while its air volume is 147 cfm. Weight of the cleaner is 85 lb. It is reported relatively low in cost. The Kent Co., Inc.

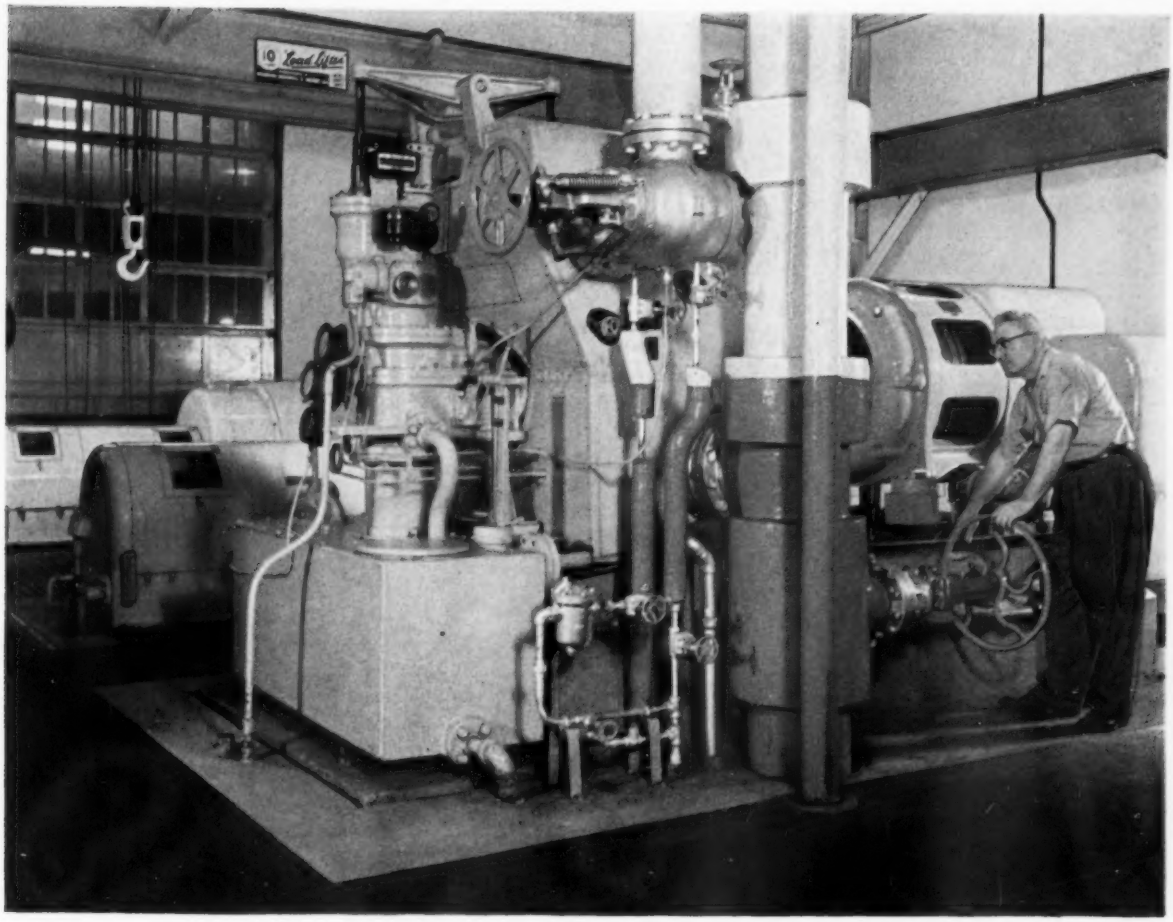
58—POWER INVERTER converts d-c to 115 a-c

For running utilities and equipment in remote locations, this compact unit uses a transistorized power circuit to convert d-c battery power to a-c. Measuring only 4-by-5-by-8 in., the unit has no moving parts, brushes, bearings or vibration contacts. Conversion efficiency is rated at 85 per cent, says manufacturer. Plug-in receptacles, on-off switch and overload fuse are all located on the front of the unit. Models are available for 12- and 24-v d-c input for 115-v 60-cycle, 200, 500-w output. Lincoln Electronics.

59—GEAR ASSEMBLY for wrench operated valves

This lightweight planetary gear operator is designed to adapt wrench-operated Rockwell Nordstrom Hypreseal Valves—used on high pressure service—to gear operation. It can be installed by one man, manufacturer states, and has a 5 to 1 gear ratio and 4 to 1 mechanical advantage. A turn of a wrench or handwheel closes or opens it. Developed primarily for valves already in service, the gear operator fits over the square plug stem and down over the body of the valve. Company says no special wrenches or handwheels are needed. Attachment requires only tightening of a set screw on the valve plug stem and adjustment of two top screws which

For more facts circle 597 on Reply Card ⟶



Power plant, Downingtown Paper Company, Downingtown, Pa. Painting by Harry J. Sieck, Pottstown, Pa.

DO IT WITH COLORPOWER!

DU PONT PAINT PLAN BOOSTS PLANT EFFICIENCY

New way to improve plant performance: Du Pont Color Conditioning! Du Pont developed it to help create ideal seeing and working conditions in every type of industrial plant. This scientific painting plan uses the power of color to raise employee morale, promote safety, boost production. Let us show you how many ways you can put this practical system to work profitably in your plant . . . at no more cost than regular maintenance painting. Just mail the coupon below for complete information.

COLOR CONDITIONING PAINTS

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.) Dept. PE-810
Finishes Division, Wilmington 98, Delaware

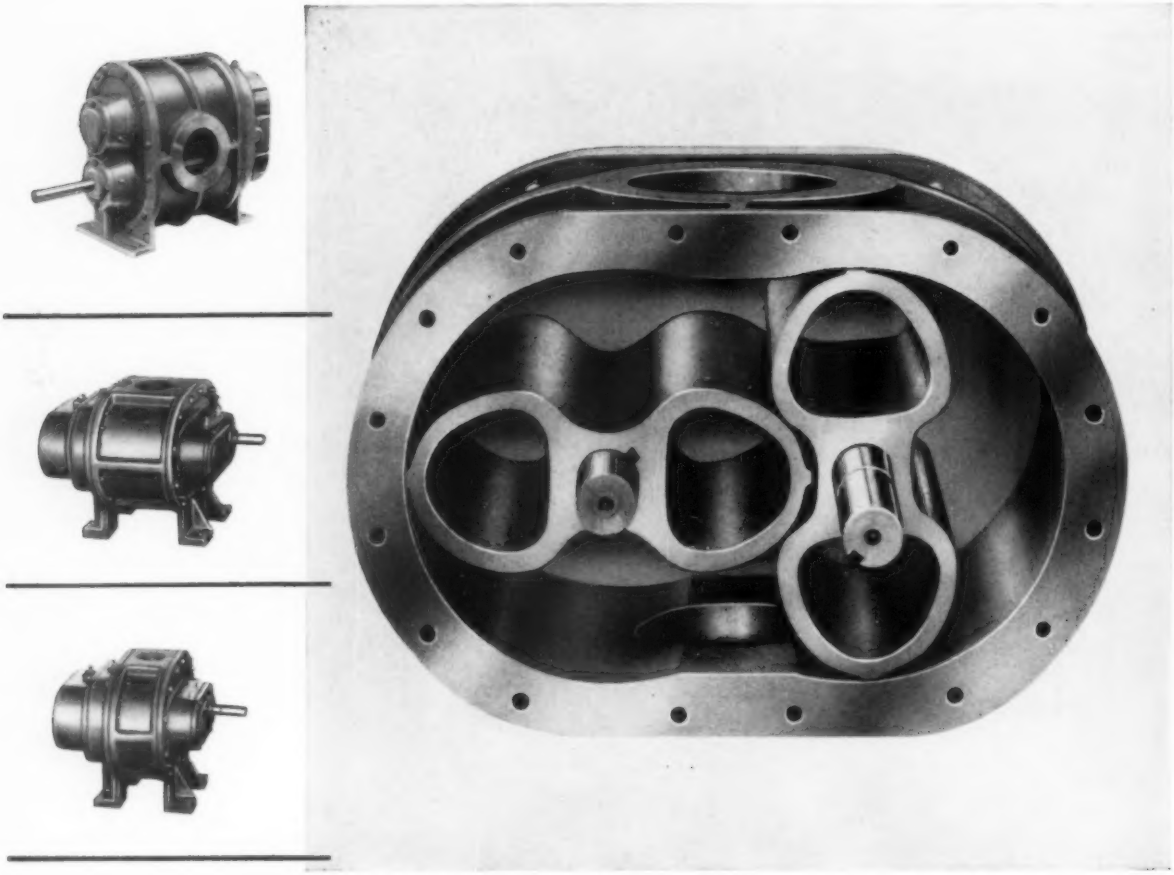
Please send me the 28-page, color-illustrated book, "Du Pont Color Conditioning."

Name ..... Title .....

Company .....

Address .....

City ..... State .....



Sutorbilt blowers deliver air or gas at capacities up to 20,000 cubic feet per minute and pressures or vacuums up to 10 pounds. Design incorporates two figure-eight impellers which rotate in opposite direction and deliver a metered volume of air or gas.

SUTORBILT BLOWERS ASSURE TOP PERFORMANCE AND DEPENDABILITY

You want peak performance . . . from a blower that needs no special attention. Sutorbilt *ruggedness* gives it to you! Cases, headplates and impellers are of sound, close-grained cast iron. Heavy-duty anti-friction bearings maintain factory clearances throughout long service life. Wide-face herringbone gears, —run in a bath of oil—are engineered to absorb heavy shocks without affecting precise timing of impellers.

These and other Sutorbilt design features —plus highest-quality manufacturing methods—assure maximum, maintenance-free service from Sutorbilt blowers and gas pumps. Write for illustrated brochure giving complete specifications.

Representatives located in principal cities. Consult your classified telephone directory.

SUTORBILT IS WELL BUILT

CORPORATION, 2966 East Victoria St. • Compton, Calif.

Subsidiary of Fuller Company, Catasauqua, Pa.

FULLER COMPANY GENERAL AMERICA TRADE MARK

ROTARY POSITIVE-PRESSURE BLOWERS AND GAS PUMPS WITH VERTICAL OR HORIZONTAL MOUNTING

1163
S-10

For more facts circle 598 on Reply Card

NEW PRODUCTS

(Begins on page 138)

contact the packing injector box. The plug stem projects through the gear operator. Meter and Valve Div., Rockwell Mfg. Co.

60—VERTICAL MOTOR for all weather conditions

For outdoor operation under all weather conditions, this vertical motor is announced as meeting NEMA Type II weather protected specifications and comes in ratings from 250 to 2000 hp, in both hollow and solid shaft construction. Primary uses are in chemical and petroleum processing, and other applications in which vertical motors must operate without shelter or additional protection. The motor is cooled by ventilating air taken from the surrounding atmosphere. To free this air of moisture and dirt before it enters the heart of the motor, it goes through three 90-deg changes in direction, is lifted vertically through screens, and expands in an air passage so that velocity is reduced to less than 600 fpm. The motor's bearing construction, as standard, provides high thrust capacity. Bulletin 2600 gives engineering information. The Louis Allis Co.

Reader Service Cards on pages 211-212 make it easy to get further information on any of these products. Just circle the item numbers of the products you would like to know more about.

61—TRANSMITTERS, indicating, non-indicating types

Now in the Ashcroft line of pneumatic transmitters are pressure transmitters of indicating and non-indicating types, a bellows actuated indicating pressure transmitter, and an indicating temperature transmitter. The Series 1250 Solid Front Ashcroft Pneumatic Pressure Transmitter incorporates the Maxisafe Duragauge as the sensing and indicating element for measuring pressures to 100,000 psi with accuracy given as ½ of 1 per cent. Its output is a 3-to-15 or 3-to-27 psi signal proportional to input pressure.

Series 1260 Non-Indicating Ashcroft Penumatic Pressure Transmitter feeds to indicating gages, re-

magnificent in **every** way!

✓ in performance
✓ in economy
✓ in styling

MAGNIFICENT MODINE GAS-FIRED UNIT HEATER

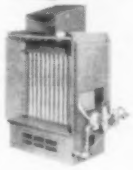
Any way you look at it, the Modine is a beauty. Outside, superb styling. Inside, quiet efficiency.

Individually fired, contoured tubes assure quick, uniform heat. Stainless steel burners resist rust and corrosion, won't clog. Result: long life, utmost fuel economy.

And Modines are *up to 50% lighter* than other makes — cost less to ship and install. Eight models, 25,000 to 310,000 Btu. Available from *stocking distributors in all principal cities.*

2 more popular Modine gas-fired products

BLOWER TYPE UNIT HEATER — 7 models, 50,000 to 310,000 Btu.



DUCT FURNACE — 5 models available from 88,000 to 213,000 Btu.

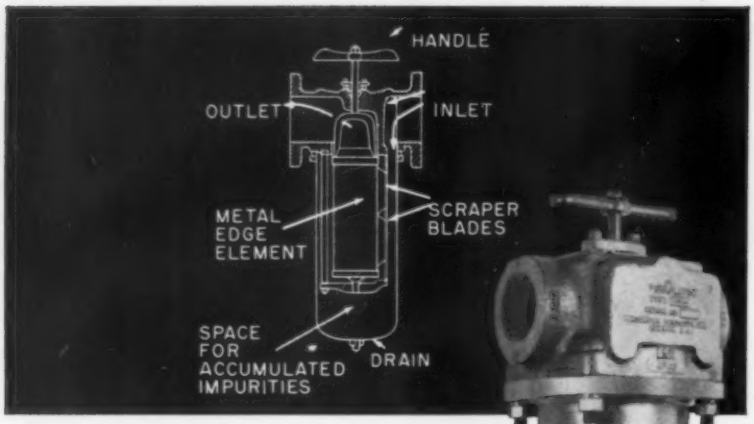
GU-1377

FULL DETAILS *are contained in new Catalog 658. See your distributor or write Modine Manufacturing Co., 1563 DeKoven Ave., Racine, Wisconsin.*

In Canada: Sarco Canada, Ltd., Toronto, Ont.

Modine
FIRST NAME IN UNIT HEATING

For more facts circle 599 on Reply Card



This one standard Purolator filter is

EXACTLY RIGHT for all these fluids:

- inks
- paints
- varnishes
- food products
- greases
- process fluids
- fuel and lube oils

SPECIFICATIONS: This Purolator filter—model G-141J—is designed for filtration in a range upward of 40 microns.

It can be installed on pressure or suction side of pump.

It is recommended for capacities of from 6 to 200 GPM, dependent on viscosity. Spacing varies from .0010 to .020.

Relief valves set from 10-12 (generally 15 to 20) to 50 PSI are incorporated in several models.

Motor driven knife blade to clean element can be furnished whenever conditions make manual rotation impractical.

Maximum pressure: 125 PSI; Weight: 37 lbs. Equipped with simplex full-flow metal element oil strainers.

Available in all stainless steel construction for corrosive liquids, process fluids, food products.

If this filter's specifications recommend it for a problem of yours, write for catalog sheet to Dept. PF2-103.

Filtration For Every Known Fluid

PUROLATOR

PRODUCTS, INC.

Rahway, New Jersey and Toronto, Ontario, Canada

For more facts circle 600 on Reply Card

NEW PRODUCTS

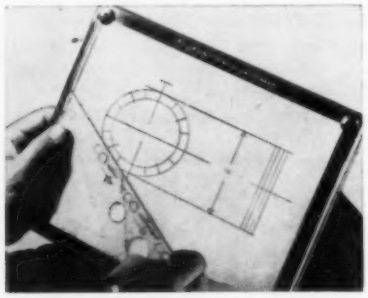
(Begins on page 138)

cording receivers and/or controllers. It comes in standard ranges of 0 to 100 in. of water and 0 to 20,000 psi with accuracy given as ½ of 1 per cent, sensitivity, 1/10 of 1 per cent. It is described as compact, and an economical means of transmitting information while keeping high pressure from the control area.

In the Series 1253 Ashcroft Solid Front Bellows Actuated Pneumatic Pressure Transmitter, the bellows actuating element permits measuring of low pressures from 0 to 20 in. of water. Series 3800-3900 Ashcroft Solid Front Pneumatic Temperature Transmitter measures temperature in installations where a thermostatic element is preferred. Manning, Maxwell & Moore, Inc.

62—DRAWING BOARD weighs under 8 oz

Made of high impact polystyrene, this drawing board weighs 7½ oz and comes with two transparent plastic triangles (one each 30/60 and



45). There are two retractable metal straight edges. Four recessed spring-clips hold standard 8½-by-11 in. paper. The triangles clamp under the board when not in use. Because the board is translucent, tracings can be made by holding it against a window or lighted surface. The outfit measures 10 by 12 in., will fit in a briefcase. It costs under $6 including postage. Leslie Creations.

63—FLOAT TRAPS with increased capacities

These continuous flow type traps are suggested for draining condensate from steam equipment continuously, and automatically, such as ahead of condensate meters. This continuous flow feature is also desirable for draining moisture from air and gas purifiers, separators, receivers, tanks and similar equipment. Trap capacities range as high

MOLDED CASE CIRCUIT BREAKERS

"Our new automated masonry cement plant is protected against costly shutdowns with I-T-E circuit breakers"

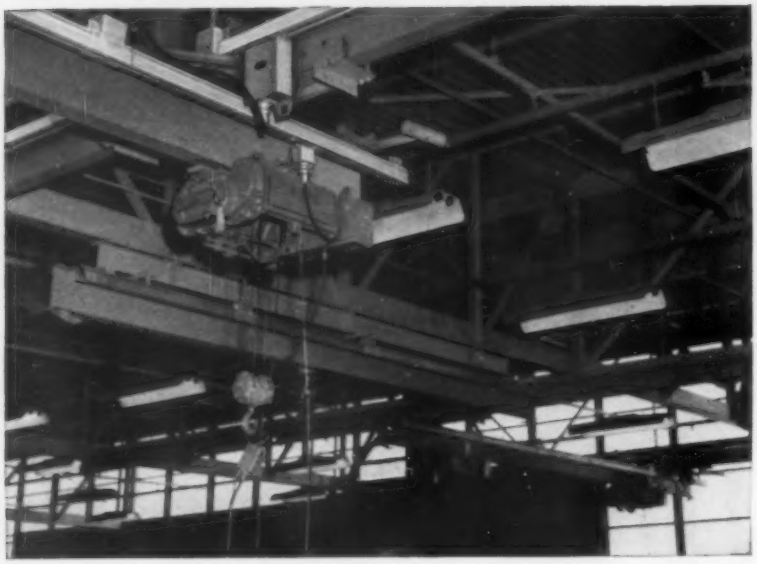
"Since momentary motor overloads can occur in our particular installation, we chose circuit breakers to eliminate the possibility of costly and unwarranted outages," says John R. Allen, designer and project engineer for G. & W. H. Corson's unique new masonry cement plant. "Circuit breakers do, of course, provide complete protection for our motors against actual faults, including protection against single phasing." The Corson Company, America's oldest lime manufacturer, and held in high regard by engineers for its many developments in the lime industry, appreciates the products and services which I-T-E provides. We think you will too, and, like all who choose I-T-E Molded Case Circuit Breakers, you will appreciate the "extra quality—*at no extra cost*" which is built into all I-T-E products. Contact your local I-T-E Distributor, or write I-T-E Circuit Breaker Co., Small Air Circuit Breaker Division, 19th & Hamilton Sts., Phila. 30, Pa. In Canada: Eastern Power Devices Ltd., Port Credit, Ont.

I-T-E CIRCUIT BREAKER COMPANY

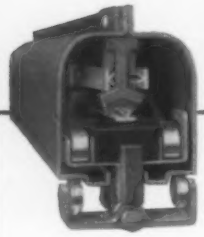
PHILADELPHIA, PENNSYLVANIA

For more facts circle 601 on Reply Card

4 EQUALLY GOOD REASONS



...why your cranes and hoists should be FEEDRAIL® powered



Throughout industry, flexible Feedrail systems, in capacities from 60 to 500 amperes, provide convenient movable power sources for:

- Cranes and Hoists
- Production Lines
- Conveyor Assembly Lines
- Moving Test Lines
- Portable Tools
- Machine Tools
- Cutting and Sewing Rooms
- Lighting
- Motor Control

1. Safe electrification. Feedrail conductors are protectively enclosed in steel – no exposed wiring, no trailing cables. You enjoy maximum protection for personnel and equipment.

2. Minimum maintenance. Elimination of frayed, sagging, broken wires means safer, less frequent maintenance.

3. Better materials handling. There are no time consuming traffic holdups with Feedrail. Fewer accidents, less maintenance mean absolutely minimum down time – more efficient materials handling.

4. Lower operating costs. Elimination of hazardous, wasteful working conditions not only leads to better performance but improves safety records and plant morale as well – eventually lowers insurance costs too.

A Feedrail "moving power system" will fit your crane or hoist's needs – can be installed quickly and easily. Get full information. Write today to Dept. P10.

SOLD BY MORE THAN 1,000 ELECTRICAL DISTRIBUTORS FROM COAST TO COAST

CH7

ELECTRIC FEEDRAIL®

Never Becomes Obsolete

FEEDRAIL CORPORATION

Subsidiary of Russell & Stoll Company, Inc.

125 BARCLAY STREET • NEW YORK 7, N. Y.

SPECIALLY QUALIFIED REPRESENTATIVES IN PRINCIPAL CITIES

For more facts circle 602 on Reply Card

NEW PRODUCTS

(Begins on page 138)

as 32,000 lb of water per hour, depending on differential pressure. Head and body are cast semi-steel, and the valve and seat of Anderloy, a corrosion-resistant nickel alloy. Other internal parts are stainless steel or bronze. The traps are designed for a maximum steam operating pressure of 250 lb. Furnished with or without a gage glass, these traps come in three sizes: No. 82 is tapped ½ or ¾ in.; No. 83, 1 or 1¼ in., and No. 84, 1½ or 2 in. The V. D. Anderson Co.

64—SPRAY OUTFIT is portable, easily used

The Steadi-Grip is a portable spray paint outfit featuring a 2-qt pressure cup separated from the spray gun, allowing the painter freedom of

movement while painting. There is no heavy cup attached to the gun, company points out, and the possibility of paint drip from vent holes is eliminated by keeping the two pieces of equipment separate. The unit is suggested for all types of lacquers and enamels, as well as standard paints. Binks Mfg. Co.

65—COMPOUND protects stored bulk materials

Compound SP is formulated to blanket and protect outdoor storage piles of bulk materials against losses from wind or rain erosion. The spray-applied solution contains additives for maximum coverage and penetration. Compound SP is described as a blend of synthetic, organic, long chain polymers in a water base that forms a thin crust which is tough, durable and resistant to weathering. In a series of heavier concentrations adaptable to a wide range of material composition, particle size and climatic conditions, they are suitable for coating

LINK-BELT P.I.V. means positive, infinitely variable speed control

Where modern production machines and operations demand extremely accurate transmission of power with variable speed control, no other variable speed drive can match the efficiency of the Link-Belt P.I.V. Here's how it works.

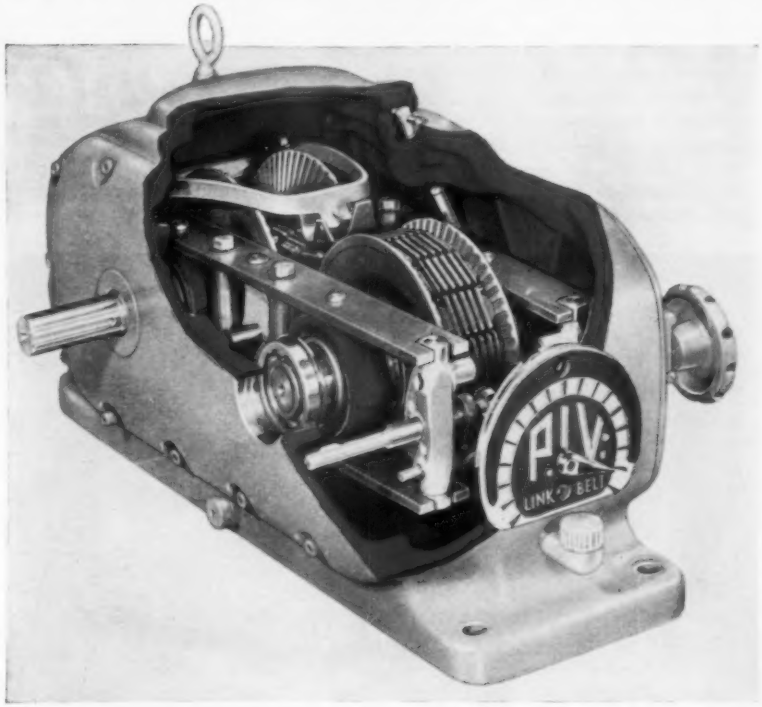
●

Because it employs an exclusive metal, self-tooth-forming chain, Link-Belt P.I.V. permits instant and accurate speed changing without perceptible loss of speed—regardless of load. And the variation can be accomplished without stopping the driven machine.

A mere turn of the control screw simultaneously varies effective diameters of conical wheels located on the input and output shafts. In turn, these radially grooved wheels mesh with the self-tooth-forming chain assuring positive selection of speed.

Call your nearby L-B office or authorized stock-carrying distributor for Book 2274.

●

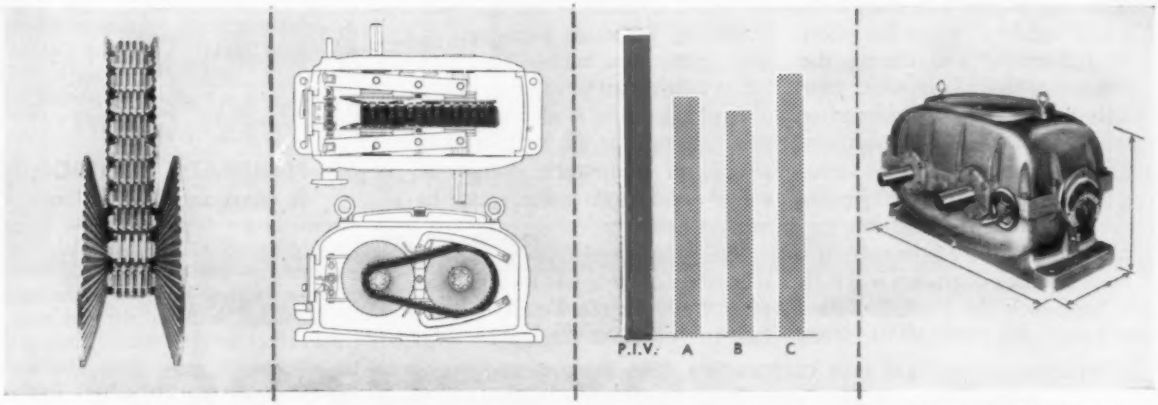


LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World.

14,318

LONG-LIFE ACCURACY and application flexibility of Link-Belt P.I.V. are unmatched by any other variable speed drive. It's available in 8 sizes and 16 standard types, in capacities from ½ to 25 hp—for horizontal or vertical mounting. Compact design simplifies installation as a separate unit or a built-in part of a machine. Even greater application flexibility can be gained by making motor and helical gear sets integral parts of the P.I.V. Of all-metal construction, P.I.V. is totally enclosed, automatically lubricated.

How LINK-BELT P.I.V. differs from other variable speed drives



POSITIVE MESH of self tooth-forming chain with grooved wheels assures full-rated hp at output shaft. All-metal construction . . .

PREVENTS SLIPPAGE because the P.I.V. drive chain does not depend on friction and is unaffected by atmospheric conditions.

UNMATCHED ACCURACY is demonstrated by this actual comparison of maintained rpm of P.I.V. and three other variable speed drives.

GREATER COMPACTNESS results from short-center arrangement of drive mechanism. Some P.I.V. models save 50% on floor space.

For more facts circle 603 on Reply Card

(Begins on page 138)

stock piles of Bauxite carbon, coal, sulfur and other types of materials. Protection is said to last a year.

Compound SP is described as inert, unreactive and non-toxic without adverse effect on burning qualities of coal or subsequent processing of sulfur, metal ores, etc. The solution is supplied in various grades for spraying at rate of 1 gal per 100 ft of surface. A color indicator can be included at no extra cost. Johnson-March Corp.

66—SURFACING MATERIAL goes on new or old masonry

Permatop is announced as a structural surfacing material, harder than concrete, which resists industrial corrosion and literally welds to new or old masonry. Claimed to be the first surfacer to provide mineral aggregate and plastic binder in a single package, it can be used to rebuild masonry floors and to repair heavy-duty roadways, walkways and ramps. Permatop consists of a resin base, liquid reactor, and chemically treated aggregate, all in one package. The pre-measured materials, mixed at the site, are ready for use. Applied much like concrete, the mixture can be troweled to a smooth, skidproof surface, it is stated, and it can be featheredged.

This product's main advantage, according to manufacturer, is the fact that it adheres tenaciously to any clean, cured masonry surface, old or new. It is pointed out that in repair work, chipping is unnecessary. Permatop is applied in thicknesses of 1/16 in. or more and treated areas can be exposed to use in a few hours. Having higher physical properties and greater density than concrete, Permatop is said to be water- and weather-proof and unaffected by common alkalis, solvents, salts, sugars, greases and mild acids. Minimum material cost is given as around 25 cents per square foot. Four colors are offered. Permagile Corp.

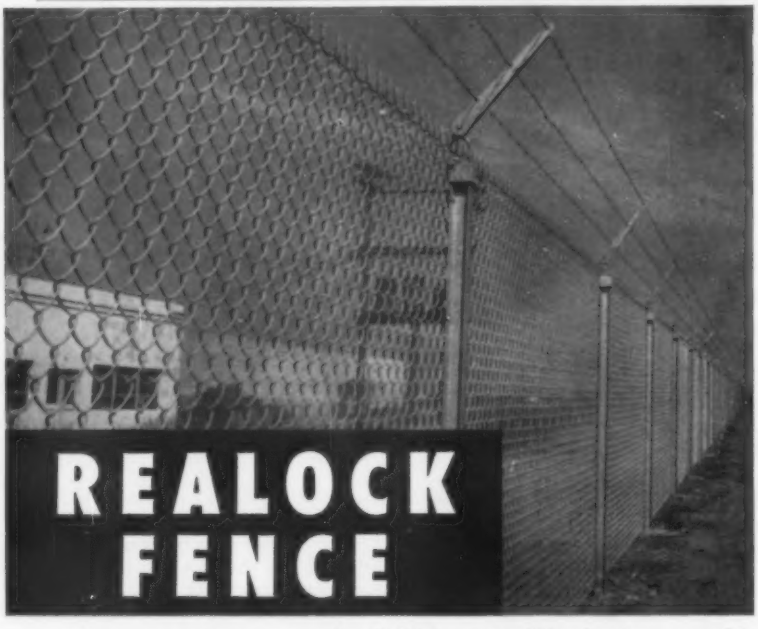
67—DYE PENETRANT in non-flammable formulation

Spotcheck, a dye penetrant inspection material, is now available in non-flammable or high-flash-point formulas in pressure-spray cans or in bulk. The new Spotcheck, which provides a convenient spray-can dye inspection method for locating

cracks, seams, porosity and other defects open to the surface in almost any solid material, is also claimed non-toxic, although manufacturer advises use in reasonably ventilated areas. Magnaflux Corp.

68—PNEUMATIC CONTROLLER is compact, low in cost

Primarily for temperature or pressure control, the USG Pilot is designed to provide not only two-position control but also wide band proportional, with or without automatic reset or rate action. Only 8½ in. square by 4 in. deep, the unit can be surface-mounted on equipment, or flush-mounted on instrument panelboards. It can also be mounted on the pneumatic-operated valve that it positions. Indication of measured variable (such as pres-



...the permanent "Silent Watchman"

Your Realock Fence becomes a "Silent Watchman", on duty both day and night . . . when the plant is in full swing and during the "after-hours" lull. It protects your buildings and property year after year...against trespassers, vandals, arsonists, thieves...and *stays* virtually maintenance-free. Hefty posts are set in concrete. Steel fabric is hot galvanized after fabrication.

And, Realock engineers will help you hand-pick the Realock Fence that's right for your job . . . from a wide variety of types . . . in light or heavy construction . . . with barbed or knuckled selvages . . . with or without barbed wire tops . . . in heights up to 13′ overall.

Realock fabric is also available in aluminum for use with steel or aluminum framework. Fabric of other non-ferrous metals can be made to your order.

Ask your nearest Realock representative for complete information and a free estimate. You'll find listings in your Classified Directory.

THE COLORADO FUEL AND IRON CORPORATION — Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION — Buffalo, New York

CF&I REALOCK FENCE
THE COLORADO FUEL AND IRON CORPORATION 5932
BRANCHES IN ALL KEY CITIES
For more facts circle 604 on Reply Card

Control Cable Savings Begin with Small Diameters

For New Work or Rewiring...

SPECIFY & BUY
ROCKBESTOS
PNR
600 VOLT CONTROL CABLE

PNR — Polyethylene • Nylon • Rockhide (PVC)

HERE'S THE PROOF WHEN IT COMES TO CONDUIT FILL

No. 12 A.W.G. (19/25)		1 CABLE PER CONDUIT				2 CABLES PER CONDUIT				3 CABLES PER CONDUIT				4 CABLES PER CONDUIT			
		Max. Cable Dia."	Number of Conductors in one Cable			Max. Cable Dia."	Number of Conductors in one Cable			Max. Cable Dia."	Number of Conductors in one Cable			Max. Cable Dia."	Number of Conductors in one Cable		
COND. SIZE-		Table 11 N.E.C.	ROCK PNR	3/64"	4/64"	Table 11 N.E.C.	ROCK PNR	3/64"	4/64"	Table 11 N.E.C.	ROCK PNR	3/64"	4/64"	Table 11 N.E.C.	ROCK PNR	3/64"	4/64"
½"	New Work	.450	2-4			.243				.234				.195			
	Rewiring	.479	2-4			.276				.252				.218			
¾"	New Work	.598	5-7	2-3		.323				.311				.260			
	Rewiring	.636	5-8	2-4	2	.367				.335				.280			
1"	New Work	.762	8-14	4-7	2-4	.412	2-3			.396	2						
	Rewiring	.811	9-18	5-8	3-5	.468	2-4			.427	2-3						
1¼"	New Work	1.000	15-19	8-12	5-8	.543	4-5	2-3		.523	3-5	2-3					
	Rewiring	1.070	17-19	9-16	6-9	.618	5-8	2-4		.564	4-5	2-3					
1½"	New Work	1.170		13-19	9-12	.634	6-8	4	2	.610	6-7	4					
	Rewiring	1.248			10-14	.721	9-11	5-7	2-4	.658	6-9	4-5	2				

This is an excerpt from the Rockbestos Control Cable Conduit Fill Chart covering sizes A. W. G. 9, 12, 14. Write today for your free copy. Ask for PNR 1-58.

ROCKBESTOS PRODUCTS CORPORATION, NEW HAVEN 4, CONNECTICUT

NEW YORK • CLEVELAND • CHICAGO • OAKLAND • LOS ANGELES • PITTSBURGH • ST. LOUIS • DETROIT • SEATTLE • ATLANTA • DALLAS

ROCKBESTOS

PNR
Small Diameter
Control Cable

MORE THAN 16,000,000 FEET IN SERVICE

For more facts circle 605 on Reply Card

Materials-Handling Made Easy

NØELTING
Faultless Casters
Give you many new ways
to cut your handling costs

NØELTING Faultless Casters

These three Faultless Caster installations are examples of the versatility and broad scope of the Faultless line. Whether you want to move 50 pounds of delicate instruments or 15 tons of sheet steel, Faultless—the "Complete Line" backed by nearly three quarters of a century of caster-making experience—assures you the right casters to best do the job.

FREIGHT HANDLING
Series 900 and 9700 Casters enable one man to handle complete loading job. Loading time has been cut in half and shipments go out more speedily.

WORK SCAFFOLDS
Series C900 Caster with dual acting brake which locks both swivel and wheel action—combines stability, mobility and safety for work scaffolds.

V-GROOVED TRACK ASSEMBLY LINE
Series 600 Caster with V-grooved wheel eliminates ten handling operations in production assembly of refrigerator and freezer doors.

Ask your Distributor!

Your nearby Faultless Industrial Distributor maintains a substantial inventory of Faultless Casters for immediate delivery. He and one of the strategically located Faultless Sales Engineers are available to work with you on every handling problem in your plant. Both are listed in the phone book Yellow Pages, under "Casters," beneath the Faultless heading.

INDUSTRIAL DISTRIBUTORS · THE RIGHT HAND OF PURCHASING

WRITE FOR FREE CONDENSED 20 PAGE CASTER CATALOG

Faultless Caster Corporation EVANSVILLE 7, INDIANA
Send Free copy of condensed 20 page Caster Catalog, 157-G

Name _____ Title _____
Firm _____
Address _____
City _____ Zone _____ State _____

For more facts circle 606 on Reply Card

NEW PRODUCTS

(Begins on page 138)

sure) is made on a 3½-in. dial 6¾-in. scale length). A pointer also indicates the knob-adjusted set point.

Three modes of pneumatic control offered are: two-position with differential gap, adjustable from 1 to 100 per cent; proportional control, adjustable 1 to 100 per cent; and proportional control (1 to 150 per cent) plus automatic reset or rate action. Design permits change from one mode to another after unit is installed. U. S. Gauge Div., American Machine and Metals, Inc.

One of these products may be "just what you're looking for." Use the handy Reader Service Cards to ask for more information on it.

69—BOOM DEVICE for bale handling fork lifts

Designed for fast, economical handling of cotton bales, this boom attachment is suitable for other bulky items and is interchangeable with other attachments fitting company's Clarklift line of trucks of 3000- to 5000-lb capacity. The attachment is 5 ft long, has a 700-lb capacity. Maximum lift height is more than 15 ft. The boom is of stainless steel tubing. An important design feature cited is a pulley and cable arrangement that permits raising the load twice the rate of upright travel, speeding warehousing and shipping operations. Swivel design of boom assembly lets load be rotated through 270 deg manually. Clark Equipment Co.

70—LIQUID CHEMICAL cleans stone, masonry

Basis of this cleaning process is a chemical, K-35, which is brushed on and then rinsed off with water to expose the clean stone. K-35 works equally well on natural stone like granite or marble and on such building materials as brick, cement and stucco, according to manufacturer. It is reported inexpensive and harmless to hands, wood, and paint, and to be economical for cleaning of lobbies and hallways as well as outside walls. Three adaptations are offered: one for exterior brick or stonework; one for interior cleaning; and one for polished or glazed surfaces, such as wall tile.

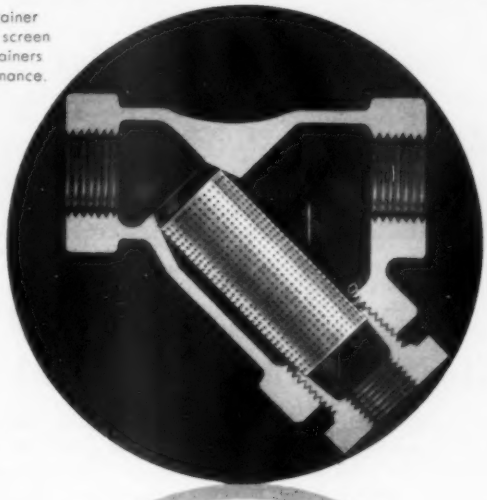
protect your equipment against scale and dirt

Exterior view of NEW Sarco Type "AT" Pipe Line Strainer. Note 45° blow-down angle to facilitate piping away from strainer.

with this

NEW SARCO TYPE "AT" PIPE LINE STRAINER

Cutaway of NEW Sarco Type "AT" Strainer shows sediment collection chamber below screen. Standard screen used in Sarco "AT" Strainers is key to their uniformly successful performance.



Examine one of the new Sarco Type "AT" Strainers and you'll notice at once that its design is a marked improvement over that of contemporary strainers . . . in three important ways:

The Sarco screen, key element of the unit, fits tightly into a long, tapered screen seat. This feature absolutely stops the by-passing of particles around the screen. Secondly, the rigid, welded construction of heavy-gauge brass makes sure the fit will remain tight, even when trapped sediment builds up pressure.

Third, you'll see that the new AT is easy to clean. No sharp edges or weave crevices in the screen for particles to cling to. Blow-down cleaning is simplified by the 45° angle construction.

Write for Sarco Bulletin No. 1210B which gives dimensions, capacities, and technical data. 7317-B

NOTE THIS ADDED PROTECTION AND CONVENIENCE

1. Bodies of heavy-duty 250 psi semi-steel. Tensile strength to 30,000 # per square inch minimum.
2. For maximum strength, bodies are reinforced with external rib.
3. Long, tapered screen seat assures correct screen position and tight fit without buckling.
4. Cap design provides a sediment collection chamber below screen.
5. Generous proportion of open screen area in relation to pipe size minimizes pressure drop.

SARCO
COMPANY, INC.
635 Madison Avenue, New York 22, N. Y.

STRAINERS • STEAM TRAPS • TEMPERATURE CONTROLLERS • HEATING SPECIALTIES

For more facts circle 607 on Reply Card

NEW PRODUCTS

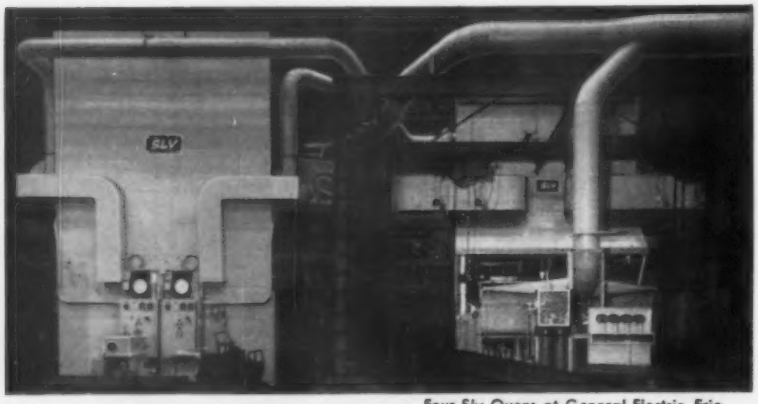
(Begins on page 138)

Used on terrazzo floors, stairways and cement flooring, K-35 is said to require less work than scrubbing with abrasives. Tests are reported to show that it removes all dirt, but does not eat away the stone's surface layer. Cleaning brings the stone's surface to light as it originally appeared, it is stated, and cost comparisons give K-35 an edge over competitive methods. K & E Chemical Sales Co.

71—PIPE INSULATION wears a jacket of aluminum alloy

Metal-On Pipe Insulation provides Thermobestos calcium silicate pipe insulation and an aluminum jacket in a single package, for installation in one operation. According to manufacturer, it offers fast installation—from carton to pipe in 90 sec. For temperatures to 1200 F, Metal-On Pipe insulation is a combination of 0.016-in. aluminum alloy integrally combined with a vapor barrier and permanently attached to sections of Thermobestos. The complete unit is installed by snapping onto the pipe. Joints are sealed with metal "snap straps" held in place with mechanical fasteners. It comes in 36-in. sections in sizes up to 24-in. pipe size by 3-in. thickness.

Additional benefits afforded by Snap-On Pipe Insulation are announced. The jacketing of aluminum alloy provides superior corrosion resistance; the jacket thickness is designed to provide, at lowest cost, outstanding appearance, stiffness and workability and resistance to abuse and pitting. Metal-On Pipe Insulation can be cut on the job. Booklet IN-217A gives details on this product. Johns-Manville.



Four Sly Ovens at General Electric, Erie.

4 SLY Ovens Give Close Baking Control at G. E.

Correct baking of varnish on armatures, field coils and frames is essential to insure full protection to the units in later use. Four vertical Sly Ovens at the Direct Current Motor and Generator Department at General Electric Co., Erie, Pa., provide the exact temperature required. They are an integral part of production, assuring a smooth, continuous flow.

The ovens are arranged in pairs. Each is a double-compartment oven with a common wall separating the zones. Each zone has its own heating and control system and individually automatic, program controlled conveyor system to meet the required, preheat, first and second baking operations. Complete cycle includes preheating, varnish dip, 4-hour bake, varnish dip and another 4-hour bake. Operations are such that the ovens reach their required temperatures prior to the start of the work day.

This installation is typical of the time and money savings Sly Convectioneered Ovens bring to drying, baking and finishing operations. *Write for catalog describing Sly's complete line.*

Designers and Manufacturers of: Dust Control Systems, Industrial Ovens, Blast Cleaning Equipment, Tumbling Mills.

SINCE 1874 SLY

THE W. W. SLY MANUFACTURING CO.

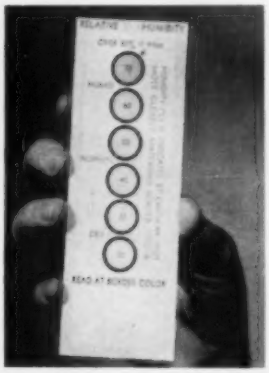
4600 TRAIN AVENUE • CLEVELAND 1, OHIO

OFFICES IN PRINCIPAL CITIES

For more facts circle 608 on Reply Card

72—HUMIDITY INDICATOR is easily used, low cost

If you can tell pink from blue you can tell humidity, according to the manufacturer of the Humigraph. This inexpensive little card has seven indicator spots whose color changes from blue to pink as the atmospheric humidity changes. The



card is scaled to show relative humidity—from 10 to 80 per cent—by reference to the color change spots. It is claimed comparable in accuracy to many hygrometers and to work at temperatures from 40 to 200 F. The card takes 5 to 10 min to respond to small changes in humidity, about 30 min to respond to a humidity change as much as 40 per cent. Not a one-time indicator, it can be used continuously, it is noted. A package of five costs around $1.00. Andrew Technical Supply Co.

73—START-UP STRAINERS protect pumps in piping

These large size, start-up strainers are designed to protect boiler feed, condensate and circulating pumps and other equipment installed in new piping construction. Available in 6- to 16-in. steel construction with 150- or 300-lb flanges, the strainers protect against dirt, mill

ON RAIL . . . ON RUBBER AMERICAN YARD CRANES HANDLE STOCK—FAST!

A distributor of heavy construction materials, rail and track equipment, L. B. Foster Co., Atlanta, requires dependable yard handling equipment for fast stockpiling . . . fast loading. In their big six-acre yard, an American DiesELectric* Locomotive Crane and an American 300 Series Self Propelled Crane team up to provide powerful, maneuverable materials handling service on rail and rubber.

Speed is essential for Foster's prompt customer service . . . their Americans meet this demand—move heavy loads fast, spot them accurately!

American DiesELectric Locomotive Cranes handle yard switching jobs with speed—even move loaded cars over grades and curves. They feature *smooth electric power* for travel . . . *efficient diesel power* for lifting.

In large yards . . . like Foster's . . . American Self Propelled Cranes meet the demand for mobility and speed. They maneuver easily in tight spots, roll smoothly down aisles . . . pay off in increased materials handling volume.

"*Fast, efficient, dependable* on every yard job" sums up industry's report on American Cranes in action! Low operating costs—minimum nonproductive downtime result from American's job tested design and precise manufacture.

Ask us to show you Americans *on the job.* You'll find their performance in every application outstanding. Capacities of American Crawler and Truck Cranes range from 12½ to 50 tons . . . Locomotive Cranes to 130 tons!

*Trademark

PROMPT DELIVERY of heavy construction materials requires fast, dependable yard cranes. Foster uses an American 300 Series Self Propelled Crane (above) for truck loading—an American DiesELectric Locomotive Crane (below) for switching, moving cars and handling heavy shipments.

AMERICAN HOIST
and Derrick Company
St. Paul 7, Minnesota

EXCAVATORS-CRANES to 2 yds.-50 tons
DERRICKS-HOISTS to 800 tons
LOCOMOTIVE CRANES to 130 tons
REVOLVER-CRANES to 400 tons

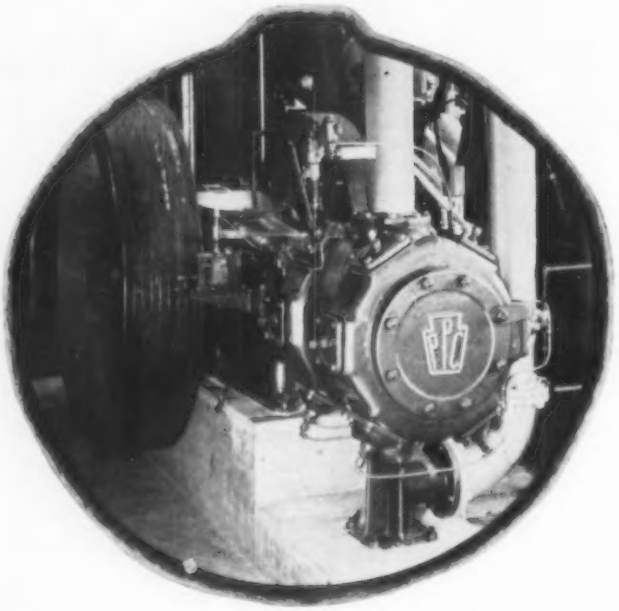
AMERICAN HOIST PACIFIC COMPANY
Special materials handling equipment

CROSBY-LAUGHLIN DIVISION
Drop forged fittings for wire rope-chain

For more facts circle 609 on Reply Card

*with this valve

COMPRESSOR OPERATES 44,000 HOURS WITHOUT REPLACEMENT PARTS



Forty-four thousand hours of continuous service! This Pennsylvania Compressor has operated 16 hours per day, seven days per week for over seven years without replacement of a single part. The piston has traveled 274,000 miles. The valve discs have seated 790,000,000 times. Consider what this kind of dependability means to production, to say nothing of eliminating maintenance costs.

Reports such as this are commonplace at Pennsylvania. There's a Pennsylvania Compressor to match the job you have. Write today for the brochure COMPRESSORS FOR INDUSTRY, describing Pennsylvania Compressors from 10 to 350 hp.

***With this valve,** every Pennsylvania Compressor provides outstanding service. It's the Air Cushion Valve which is constructed entirely without nuts, bolts or screws to work loose or burn fast. Stainless steel valve discs lift against a soft cushion of air . . . there is no metal working against metal. Life is prolonged, maintenance diminished. Valve can be assembled or disassembled in seconds. Inlet and discharge valves are interchangeable.

PENNSYLVANIA
PUMP AND COMPRESSOR CO.
Easton, Pa. • Earning Customer Confidence Since 1920

For more facts circle 610 on Reply Card

(Begins on page 138)

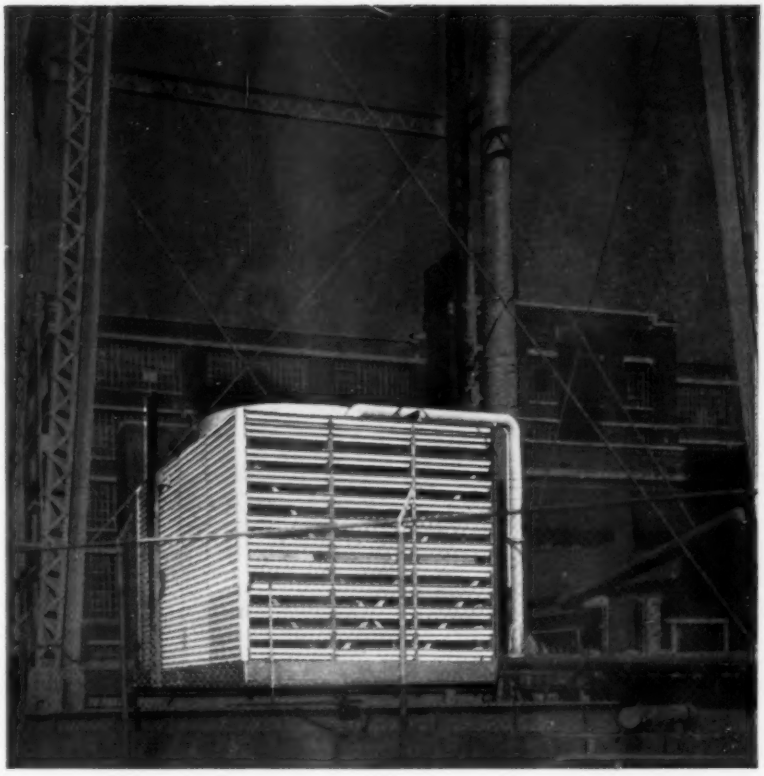
scale, and other debris common to new piping systems. The "straight-through" pipe construction keeps pressure differential across the strainer to a minimum, it is noted, and the removable screen permits option of leaving strainer body in the line permanently or removing strainer for reuse and replacing it with a spool piece. The screen may be cleaned by inserting an air, steam or water lance and flushing trapped debris down the cleanout drain. The latter is threaded for cap or gate valve, and the strainer may be installed horizontally or vertically. Manufacturer says this self-cleaning feature reduces cleaning time to about 10 min. Leslie Co.

74—STEAM GENERATOR with 15-bhp heater coils

This flash-type 30 bhp steam generator is composed of two 15-bhp heater coils and two burners with individual controls, so either half may be operated independently. The 30-bhp size has flash-type continuous coil construction. It is said to produce dry, saturated steam in 2 to 3 min from a cold start, resulting in big fuel savings, company says, since burner operates only when steam is required. The steam generator is a complete package—installation is a matter of connecting to water, fuel and electricity. No walled-in areas are necessary. Only 30-by-96 in. of floor space is needed. Malsbary Mfg. Co.

75—CURVE CROWN PULLEY eliminates belt stretch

The Curve-Crown Pulley is claimed to improve upon the features of the conventional taper crown and flat-face pulleys, and eliminate disadvantages. The crown of the pulley is accurately formed on the outer ends of the rim, to provide maximum training effect while eliminating belt stretch and wear. The pulley also features a squeeze-lock hub which transfers loads from shaft to hub and from hub to rim, it is explained, and yet eliminates weldments between hub and pulley end plates. In addition, the squeeze-lock hub provides sufficient locking forces without keyways. Theory of the Curve-Crown Pulley is based on the fact that training is needed only when belt is running off or has a tendency to run off one side of pulley; therefore only the outer ends need be



Most logical solution to a common situation . . .

Marley DOUBLE-FLOW AQUATOWER*

More water . . . that is the problem of plants the country over. Construct another standpipe? . . . or find some simple, economical way to conserve the available water supply? This was the option of a midwest manufacturer who uses substantial quantities of water for process cooling and air conditioning.

The problem was solved — successfully, completely, permanently — by a Marley Double-Flow Aquatower. In effect, it multiplied the available water supply by 20, since it saves more than 95% of the cooling water that would otherwise be wasted. The plant engineer located the compact Double-Flow Aquatower beneath the existing standpipe, thus requiring no additional ground area.

Throughout industry lies a broad range of cooling requirements of 250 gpm and up — and in this "intermediate-capacity" area Marley Double-Flow Aquatowers fill the bill. They offer big-tower performance with small-tower compactness . . . require minimum investment and upkeep. There just isn't anything like the Double-Flow Aquatower, as you'll discover when your Marley Application Engineer in any of 55 cities demonstrates what it can do for you.

*Trademark Reg.

MARLEY **The Marley Company**

Kansas City, Missouri

For more facts circle 611 on Reply Card

NEW PRODUCTS

(Begins on page 138)

crowned. The result, company says, is superior training effect and no belt stretch or wear. Stephens-Adamson Mfg. Co.

76—OFF-HOUR CONTROL FOR fan heating units

The Illinois Night Control is a compact pre-wired package having application with heating and air conditioning systems where it is desirable to automatically adjust temperatures during unoccupied periods. Included in the cabinet is an automatic time clock, a low-limit thermostat, a magnetic contactor and a manual selector switch. The control is designed to shut off fan motors, either singly or in groups, then permit the heating unit to continue to provide a tempering effect in the controlled area by convection. When the space temperature drops below the desired level, the control again starts the fan.

This control does not interfere with normal temperature regulation or duplicate functions of other devices or equipment, manufacturer explains; it supplements them to reduce needless motor operation. Its clock can be dialed to a one- or seven-day program and may be set to control fan motors by means of its magnetic contactor, available in three sizes with a maximum ampere rating between 9 and 22. Bulletin 570 gives details. Illinois Engineering Co.

77—IMPROVED HARDENER for concrete floors

Hornstone, a crystalline chemical hardener for concrete floors has been improved by the addition of P-15. According to manufacturer, this additive makes each tiny Hornstone crystal "wetter" and reduces surface tension, and the resultant greater depth of penetration of the Hornstone solution into concrete increases its resistance to dusting by 15 per cent over many compounds. Other advantages announced include greater abrasion resistance of the treated concrete, and increased resistance to chemical attack and prevention of free passage of oils and greases. Hornstone is a powdered chemical hardener. Company's liquid chemical hardener, Hornolith, for those preferring a pre-mixed solution, also contains the new additive, P-15. A. C. Horn Companies.

78—OVERLOAD CLUTCHES for torque control

The Safe-Torque line of mechanical overload clutches is announced for use as a subassembly or for attachment to a source of power. Two standard ratings of torque control clutches are: 0 to 84-in.-lb and 48 to 120 in.-lb. These clutches are reported to transmit more torque than other units of equal weight or size. There are two general types—one-shot, and continuous overriding. One-shot clutches may be re-engaged in one of several ways, depending on design: by reversing the rotation of the drive shaft; by axial movement (up or down); or by other means. Continuous overriding clutches are used on slow-running applications.

Overrunning roller drive of these clutches provides both precise and instantaneous release whenever preset torque is exceeded, it is explained; when clutch is operating within proper limits, rollers are wedged between inner cam drive and outer shell or body. All parts deform elastically when rollers climb into the wedging position. When manually preset torque is exceeded, rollers override high points

MUELLER BRASS CO. PVC

(POLYVINYL CHLORIDE)

RIGID PLASTIC PIPE AND FITTINGS

for dependable, low cost chemical handling and industrial piping

CORROSION RESISTANT PVC pipe and fittings are immune to the corrosive action of most acids, alkalies, liquids and gases. The smooth interior walls minimize the build-up of deposits, assuring unrestricted flow.

DURABLE AND DIMENSIONALLY STABLE PVC has high tensile strength and the durability to withstand heavy shock loads, vibrations and rough handling. Dimensional stability is excellent under stress, impact and moderately high temperature.

ECONOMICAL MUELLER BRASS CO. PVC products provide a low-cost solution to corrosion problems . . . lightweight for fast, easy handling . . . rugged, long wearing, no need for frequent replacement. Either threaded or solvent cemented piping systems can be readily installed.

Write today for your free sample

C-103

NORMAL IMPACT PVC — good impact strength . . . maximum chemical resistance

HIGH IMPACT PVC — maximum impact strength . . . high chemical resistance

Pipe is fabricated in 20' lengths; ⅛" through 3" sizes — I.P.S. schedules 40 and 80. Fittings are available in ½" through 3" sizes; threaded and socket-type for schedule 80 and in socket-type only for schedule 40.

MUELLER BRASS CO. PORT HURON 50, MICH.

Polyethylene pipe and plastic fittings, copper tube, valves and fittings

For more facts circle 612 on Reply Card

Here's why Pangborn Dust Control boosts employee morale!

The answer is in this book. You'll see why Pangborn Dust Control makes your employees happier, healthier, more efficient in a dust-free plant. Why machinery life is lengthened, housekeeping costs reduced. Why you can reclaim valuable materia! for salvage. Why you can improve community relations.

Why *Pangborn* Dust Control? Because Pangborn offers the most efficient methods of dust collection on the market. Pangborn has spent 50 years dealing with dust problems . . . experience that is incorporated in every proposal. And Pangborn's extensive line of wet and dry collectors means that one of these units can be adapted with maximum effectiveness to *any* problem.

Send for your *copy of "Out of the Realm of Dust." And remember: the Pangborn Engineer in your area will be glad to take off his coat and go to work on your dust problem at no obligation.* PANGBORN CORP., *3200 Pangborn Blvd., Hagerstown, Md. Manufacturers of Dust Control and Blast Cleaning Equipment.*

Pangborn CONTROLS **DUST**

For more facts circle 613 on Reply Card

NEW PRODUCTS

(Begins on page 138)

on inner cam drive and roll into a free position. The driven member then becomes free-wheeling and no further torque is transmitted. Scully-Jones and Co.

Use the Reader Service Cards provided on pages 211-212 to ask for more information on these products. Circle item numbers of products in which you are interested.

79—WATER MIXER is knee-operated device

For industrial washing operations where the worker's hands aren't free to control the water, the knee-operated Type H Hydroguard, thermostatic mixing valve, is available. Once the mixer has been turned to provide the water temperature desired up to 110 F, he can move the volume lever with his knee to turn the water on and off. His hands are free for his work. According to manufacturer, this unit provides water at the proper temperature regardless of fluctuations in supply temperature and pressure. The Type H Hydroguard has a 10 gpm capacity at 45 lb pressure, is claimed accurate to within ± ½ deg F, and provides water at any temperature between 65 and 110 F. A built-in shut-off is provided to stop water flow if temperature exceeds 110 F. Additional information is in Bulletin 366. Powers Regulator Co.

80—SAMPLE COOLER now comes in stainless steel

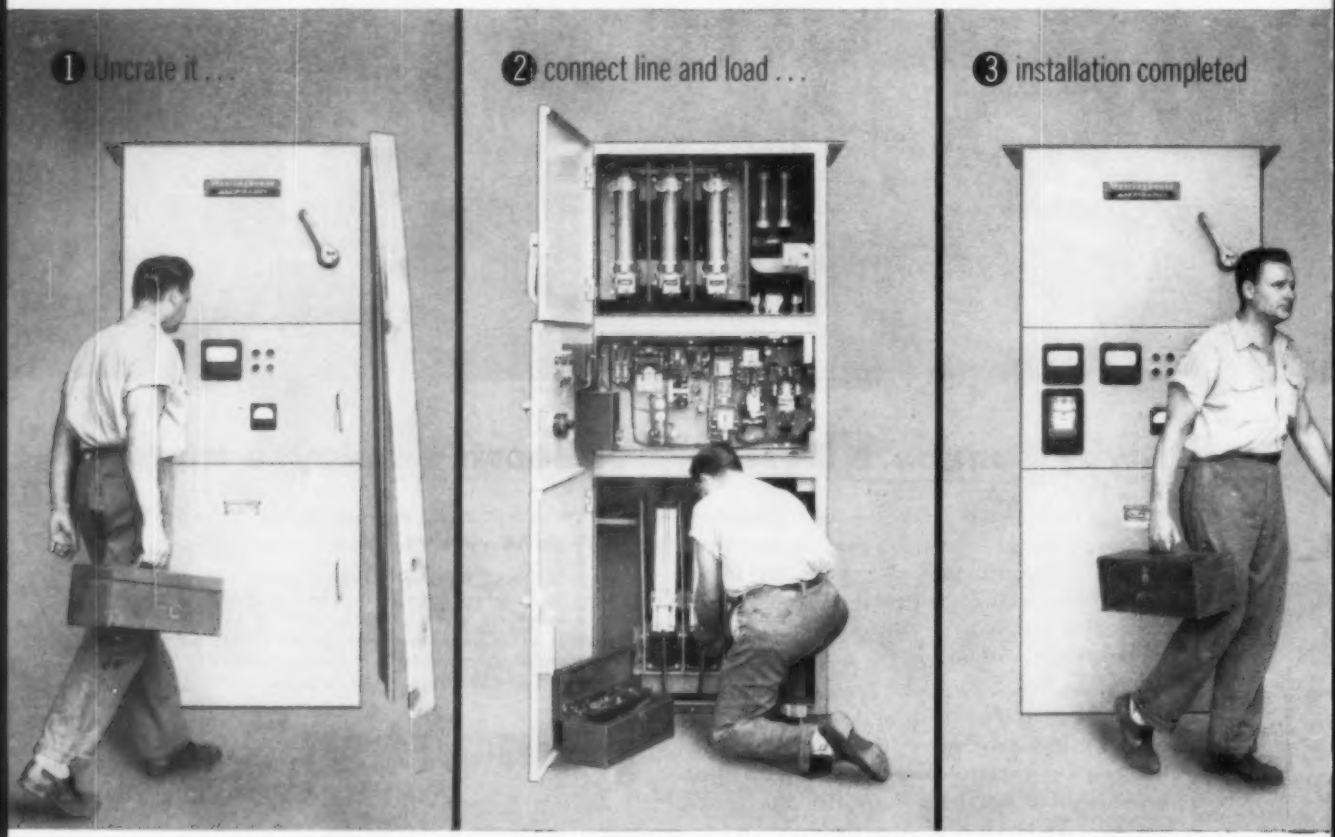
For applications in the petroleum, chemical and process industries, this manufacturer's sample cooler is now offered in corrosion resistant stainless steel. The rugged counterflow heat exchanger is coil-within-a-shell type construction and originally designed for sampling boiler water, steam feed-water and other hot fluids in power plants. Company engineers claim the sampler heat exchanger is ideal for cooling high temperature chemical solutions and process liquids—at line pressures to 6000 psig—prior to testing at atmospheric conditions.

Because of its light weight—18 lb—and slender cylindrical design, the stainless steel unit can be installed at critical check points in overhead piping and relatively inaccessible areas. Available with screwed or socket welding adapter sample connections, cooler can be integrated with piping. Hagan Chemicals & Controls, Inc.

81—REGULATOR has magnetic electric amplifiers

Bulletin 5100 Type GS is an all-purpose two-stage regulator combining features of magnetic and electronic amplifiers. Electrically isolated inputs, compactness and minimization of drift are announced for it. The regulator will be applied on adjustable-voltage d-c drives and other applications for voltage and current regulation in speed, tension, position and similar systems. This regulator has a magnetic amplified control input stage and a grid-controlled rectifier power output stage. A "grid switching" circuit controls output rectifiers.

Reliability and long life virtually free of maintenance are claimed. The basic regulator is made as a compact and complete unit. Each of four principal components: ex-



citer unit (power), grid switching unit (control), reference unit and time delay unit are unitized and potted in individual steel drawn enclosures. Three sizes are available: 5 amp maximum, 12.8 amp maximum, and 36 amp maximum with intermediate ratings available. Clark Controller Co.

82—PORTABLE HEATER has built-in thermostat

For providing temporary comfort heat in otherwise unheated areas, and for thawing out frozen machinery this re-circulating oil-fired portable heater is described as a furnace on wheels, complete with automatic electric ignition. You just plug it in and set the dial on the built-in thermostat, company explains; this automatically turns the heat on and off to maintain a comfortable temperature. A fuel saver, this feature is claimed to let the heater run up to 30 per cent longer on a tank of kerosene or No. 1 or 2 fuel oil.

Other features announced are an electrically driven fan and enclosed combustion chamber designed to burn the fuel completely, producing maximum heat without odor or fumes. An air control is provided

to compensate for variations in fuel, temperature or altitude, and a low-fuel cut-off switch is also provided. Six sizes range 100,000 to 1,000,000 Btu per hour. Stow Mfg. Co.

83—DUST COLLECTORS are compact and efficient

Although three models are available, covering capacities of 450, 900 and 1800 cfm, the largest unit in the Type M Unit Dust Collectors is only 26 by 40 by 72½ in. This compactness is attributed to careful placement of equipment within the enclosure. Dust laden air is delivered to a small diameter, high efficiency, centrifugal pre-cleaner where all but the finest particles are removed. The air then passes through steel wool filter pads, 3 in. thick, for final cleaning. Dust receptacles are gasketed, sliding drawers, secured with a hand wheel. The after-cleaner, accessible through an expanded metal panel, usually requires cleaning, not more than once every two weeks, says manufacturer, depending on usage. Where conditions will not permit re-entry of cleaned air into the working area, the filters of the Type M are replaced with enclosures and the air vented to the outside. Exhaust stack connections are furnished at the top of the unit. Both re-entry during the winter to conserve heat, as well as venting during the summer for ventilation, are accomplished by equipping the unit with both exhaust stack and filters. The Kirk & Blum Mfg. Co.

84—SYNTHETIC LUBE gives longer chain life

Unlike light penetrating oils commonly used to lubricate chains, Anderol L-732 is a tacky, semi-fluid grease. It will flow to some extent, it is noted, but retains a gel structure that lubricates as a grease, giving longer lubrication periods. Also, being tacky, it resists wipe-off, throw-off and run-off and is claimed

Westinghouse *AMPGARD* high-voltage starters . . . completely factory wired . . . shipped in one package . . . easily installed

Specify Westinghouse AMPGARD* high-voltage starters and you automatically reduce installation time and expense. Why? . . . Your Westinghouse high-voltage starter arrives completely ready for operation . . . it's all wired, completely assembled and pretested. No need to wire and assemble separate contactor units. Just make the line and load connections and you're in business.

Available for squirrel-cage, wound-rotor and synchronous motors up to 5000 volts, Westinghouse AMPGARD high-voltage starters simplify and reduce future maintenance . . . contactors are completely serviceable without removal from the starter . . . tilt-out arc chutes of Type H stationary contactor permit immediate inspection of all essential parts . . . contacts can be replaced in minutes.

For complete information about new Westinghouse AMPGARD high-voltage starters, contact your nearby Westinghouse representative, or write: Westinghouse Electric Corporation, P.O. Box 868, 3 Gateway Center, Pittsburgh 30, Pennsylvania. J-22138

*Trade-Mark

POWER-UP starts with CONTROL

YOU CAN BE SURE...IF IT'S Westinghouse

For more facts circle 614 on Reply Card

NEW! EXCLUSIVE!

VIBRATION-PROOF RADIANT *Lamps*

OLD
NEW
Early lamp failure caused by whipping of long, unsupported lead-in wires, stretching and breaking filament.
Entire mount-unit moves evenly with vibration, thus protecting filament.

All Radiant Industrial Lamps are vibration-proof and weather-proof. They all have this time-tested, strong bridge-type construction. Use Radiant Lamps and stop lamp troubles due to vibration.

SEND for BULLETIN 27

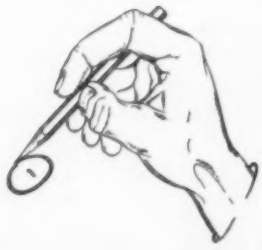
RADIANT LAMP CORPORATION

300 Jelliff Avenue Newark 8, N. J.

Manufacturers of Lamps from 50 to 10,000 watts for PROJECTION • SPOTLIGHT • FLOODLIGHT • INFRA-RED AERONAUTICAL • MOTION PICTURE PRODUCTION • MERCURY VAPOR • GENERAL SERVICE

For more facts circle 615 on Reply Card

You'll find two postage-free Reader Service Cards on pages 211-212. Use them for ordering product information — just circle item numbers of the products you would like to know more about. You may also use the cards for requesting advertising catalogs.



NEW PRODUCTS

(Begins on page 138)

to remain effective 6 mo to a year. Anderol L-732 will not gum or leave a varnish residue, company explains, and it will dissolve most deposits already formed. It is said to penetrate quicker than a petroleum oil.

This lubricant is applied in a thin stream on one side or top of the length of chain. When the chain is run, the lubricant works through the chain, leaving a thin film over all parts, inside and out. This film is an adequate rust preventive, according to manufacturer, and protects for many months because of its resistance to sling-off, good lubricity and non-volatile characteristics, oxidation stability and the fact that it is unaffected by moisture. Lehigh Chemical Co.

85—GAS ABSORBER for vent gases and mists

Special No. 13 Design 7 Gas Absorber is for scrubbing vent gases and mists whose composition may vary from acid to alkali—ranging from reducing to mild oxidizing conditions. The unit is reported well adapted to handling laboratory vent problems as well as small process ventilation. The shell is of ¼-in. polyester resin bonded fiber glass. Interior spray piping and nozzles and washer cell frames are polyvinyl chloride. The unit consists of three separate stages, the first containing a Monel perforated screen to remove solids or other particulate matter. The second stage contains 4-in. deep fiber glass filter cells. Both of these stages are sprayed with absorbing liquid automatically maintained at a fixed pH to minimize corrosion and consumption of neutralizing chemicals. The final stage is for entrained moisture droplet removal and consists of a 2-in. deep Dynel filter cell. Air Cleaning Div., Buffalo Forge Co.

86—KIT measures solution strength in 30 sec

With the H-VW-M Cleaner Control Kit, principle is determination of pH by titration, but the result is calibrated so that you read it directly as ounces of cleaner per gallon of solution. Anyone can make the test on the spot, says company, by following directions on container, and the sensitivity affords sufficient accuracy for all practical purposes.

ARCHITECTS and ENGINEERS: Skidmore, Owings & Merrill
GENERAL CONTRACTORS: Chell and Anderson
HEATING and PROCESS PIPING: Wm. A. Pope Co.
AIR CONDITIONING and VENTILATION: Cicero Sheet Metal Co.

Efficient Manufacture Employee Well-being

both aided by Clarage "air" in new Avon cosmetics plant

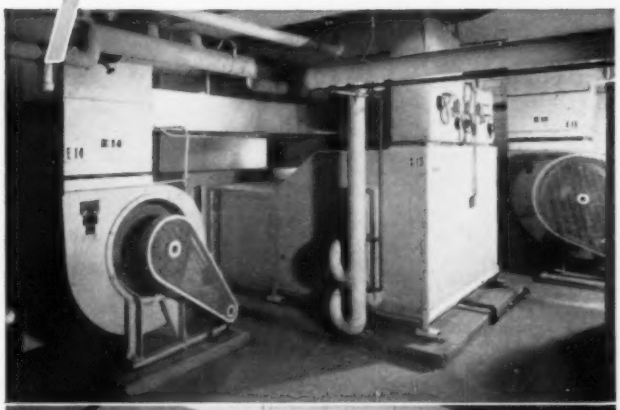
Here is much more than a thoroughly modern manufacturing facility. Here is a national sales center as well.

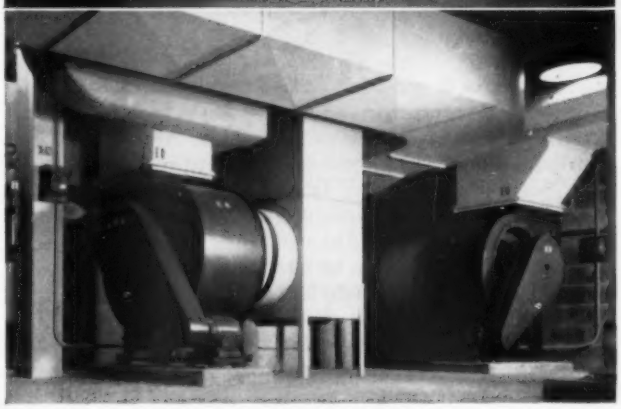
It's the new Avon Products, Inc., plant at Morton Grove, Illinois. From it flow the widely popular Avon cosmetic products. To it come members of Avon's door-to-door sales organization for training and sales meetings.

Air conditioning, thus, has a dual role to play in this structure – for employee comfort and for efficient manufacturing processes.

As for so many other noteworthy buildings, Clarage equipment was selected – some of which is shown on the right. On the job are Clarage Ready Unit ventilating sets, system fans, and Multitherm air conditioning units, including the famous Blow-Thru units pioneered and perfected by Clarage for multi-zone service.

You, too, will find it profitable to specify Clarage for your next assignments – no matter how large, how small. CLARAGE FAN COMPANY, Kalamazoo, Michigan.





CLARAGE *. . . dependable equipment for making air your servant*

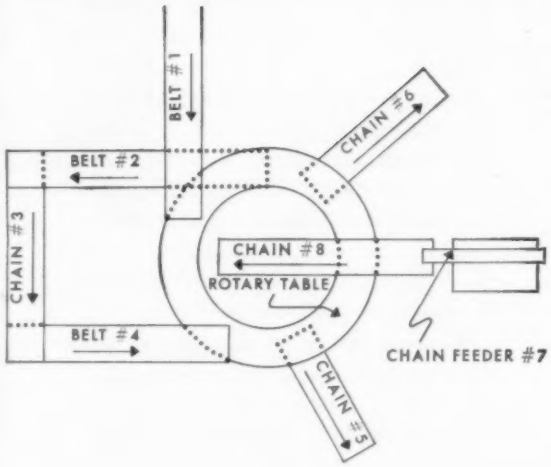
SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal
For more facts circle 616 on Reply Card

Variable barking-grinding rates synchronized by pushbutton

JEFFREY CONVEYING SYSTEM

At this pulpwood mill, barking drums prepare wood at a 0 to 30 cords per hour clip... grinders consume 4 to 12 cords per hour... Jeffrey conveyors synchronize supply and demand by merry-go-round routing and stockpiling of wood.

Here's how it works: Barked wood is discharged to conveyor #1. More than enough is diverted to conveyor #2 because correct sizes must be selected to efficiently load magazines for batch grinding. Conveyors #3 and #4 take excess wood to rotary table where remote-control plows divert it back to grinders as needed... or to stockpile conveyors #5 and #6. Any deficiency in supply from barking drums is made up by routing wood from stockpiles to rotary table via chain feeder #7 and conveyor #8.



Are you looking for a better way to move materials *where* you want 'em, *when* you want 'em? Jeffrey conveying equipment is built for the long haul, for an uninterrupted flow of operations or flexible stop-n-go handling of materials. Let us show you how to save time and money with Jeffrey conveying equipment. The Jeffrey Manufacturing Company, 853 North Fourth Street, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT... TRANSMISSION MACHINERY... CONTRACT MANUFACTURING

For more facts circle 617 on Reply Card

NEW PRODUCTS

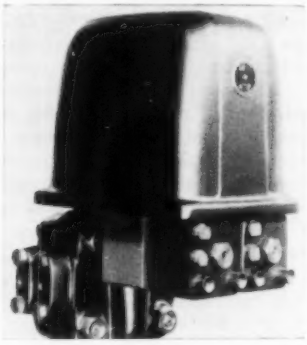
(Begins on page 138)

The kit consists of a clear glass test bottle with a volumetric mark, stoppered with an etched medicine dropper, and a dark glass bottle containing an indicator, and also stoppered with a medicine dropper.

You fill the clear test bottle to the mark with tap water, and add the proper amount of cleaner solution. Then you add the indicator, drop by drop, until a color change takes place in the test bottle. The number of drops of indicator required for the color change, multiplied by a factor that is constant for the particular cleaner used, is read as ounces of cleaner per gallon of cleaner solution. Indicators are available for both alkaline and acid cleaners and for critical points of cleaner solutions of both high and low concentrations. Hanson-Van-Winkle-Munning Co.

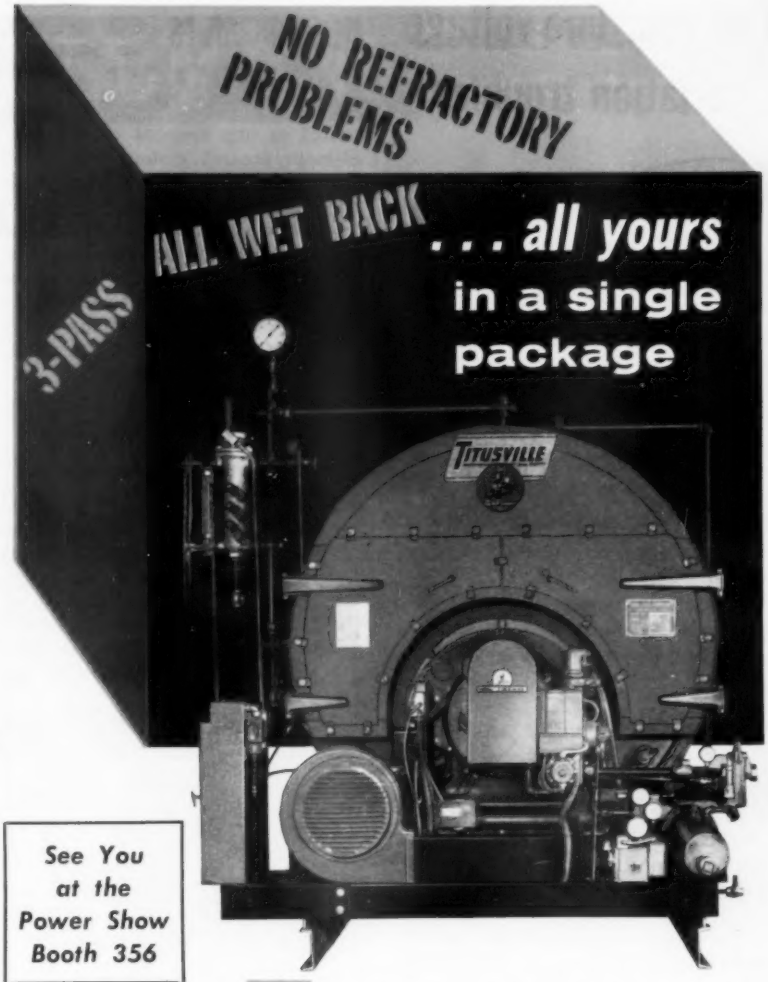
87—TRANSMITTERS measure differential pressure, flow

These force balance transmitters measure and pneumatically transmit flow, differential pressure, level and specific gravity over wide ranges. They measure over a minimum range span of 0-2 in. water under service pressures to 50 psig, to maximum span of 0-2000 in. water under



service pressures to 5000 psig. No viscous or other dampening devices are needed, it is noted; stability is maintained by a reset type booster relay.

When a pneumatic signal, varying linearly with rate of flow, is required for recording on same chart with linear quantities, or for integrating, and/or control purposes, the transmitter has a built-in square root extractor. This flow transmitter, which may be mounted on the process piping, is reported particularly



See You at the Power Show Booth 356

THE TITUSVILLE 3-PASS BOILER-BURNER UNIT

This is the modern 3-PASS boiler with *complete* wet back that makes refractory problems a thing of the past . . . the Titusville Boiler that gives you faster steaming, better heat extraction, higher efficiencies all along the line! No welded tubes, lower stack temperature—everything for longer life and dependable service. *Check us!*

Write for latest Bulletin B-3333

THE TITUSVILLE IRON WORKS CO.

A Division of Struthers Wells

BOILER DIVISION
BOILERS for Power and Heat . . . High and Low Pressure . . . Water Tube . . . Fire Tube . . . Package Units

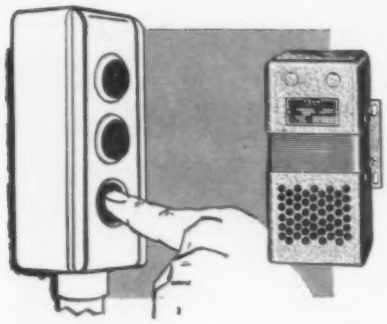
PROCESSING EQUIPMENT DIVISION
Crystallizers . . . Direct Fired Heaters . . . Evaporators . . . Heat Exchangers . . . Mixing and Blending Units . . . Quick Opening Doors . . . Special Carbon and Alloy Processing Vessels . . . Synthesis Converters

FORGE DIVISION
Crankshafts . . . Pressure Vessels . . . Hydraulic Cylinders . . . Shafting . . . Straightening and Back-up Rolls

TITUSVILLE, PENNSYLVANIA
Manufacturers of A Complete Line of Boilers for Every Heating and Power Requirement
Plants at Titusville, Pa. and Warren, Pa.
Offices in Principal Cities

For more facts circle 618 on Reply Card

End your line voltage variation troubles



If critical equipment in your plant is adversely affected when someone throws a sudden load on the line, Sola Constant Voltage Transformers can solve your problem. Just install one of these simple, dependable units between the line and each device requiring voltage stabilization.

These compact, reliable units provide output voltage regulated within ±1% with line voltage fluctuations as great as ±15%. Regulation is automatic and continuous. They are self-protecting against short circuits on output or load circuit.

Your maintenance man can install a Sola Constant Voltage Transformer in little time. He has no adjustments to make. There are no tubes, no moving or renewable parts. Once installed, these stabilizers need no further attention.

Guard against lighting failures

For mercury lamps . . . outages due to line voltage fluctuations can be avoided by using Sola Constant Wattage Mercury Lamp Transformers. *For fluorescent lamps . . .* Sola Constant Wattage Fluorescent Ballasts will provide positive lamp starting.

These fluorescent and mercury lamp ballasts operate lamps at full rated light output, regardless of line voltage fluctuations. They provide cool, dependable, ballast performance.

For full information write for literature

SOLA ELECTRIC CO.
4633 W. 16th St., Chicago 50, Ill.
A Division of Basic Products Corp.

SOLA

Constant Voltage Transformers
Regulated DC Power Supplies
Mercury Lamp Transformers
Fluorescent Lamp Ballasts

For more facts circle 619 on Reply Card

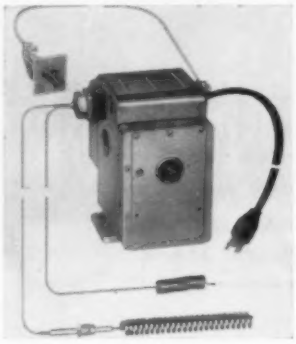
NEW PRODUCTS

(Begins on page 138)

useful as one element of a multi-element control system. Its linear rate of flow signal combines with pneumatic signals from other linear transmitters. Three standard measuring diaphragms provide all ranges. Ten-to-one differential range change is possible with screwdriver adjustment. Product Specifications P21-7 and P22-2 describe these force balance units. Bailey Meter Co.

88—CONTROL SYSTEM for the unit ventilators

An all-electrical package control system for face and by-pass type unit ventilators, the Dual Element Controller consists of a motor operator for damper control actuated by its own self-contained dual temperature sensing elements. It combines the function of thermostat and



controller in a single pre-wired package. Manufacturer says it is inherently positive positioning, and its high torque rating assures accurate positioning of unit ventilator damper mechanism. The proportioning motor operator has a rugged return spring for closing the outdoor air damper whenever the unit ventilator is shut down.

The Dual Element Controller utilizes two fast responding coil type sensing elements; one for room air temperature, and the other, an averaging type, for discharge air temperature. The controller is mounted within the unit ventilator housing. Its room air sensing element is in a sampling chamber. This control package is specifically designed for control of face and by-pass unit ventilators when used for hot water and chilled water heating, ventilating and air conditioning applications. Data Sheet F-8772 gives complete information. Barber-Colman Co.

89—CONVEYOR BELT made of Teflon coated glass

For lightweight applications, this Teflon coated, glass fabric conveyor belt is claimed to offer an exceptional combination of electrical, chemical and physical properties. Its chemical and solvent resistance, high and low temperature characteristics, and anti-adhesive, anti-friction properties suggest use in chemical, food processing, packaging, paper, plastics, textile industries. It is reported of particular value where sanitation and ease of release are important, or where hot corrosive salts must be moved quickly. Sticky, resinous or moist materials do not readily adhere to the Teflon coated glass fabric, says manufacturer, making it unnecessary to use anti-blocking or lubricating release agents.

Maximum temperature at which the Teflon coated belt can be used for long periods of time is 525 F, it is stated, and it will remain flexible and non-brittle from —100 to 525 F. Single-ply belts are available in 0.005- or 0.010-in. thicknesses. The belts come in widths up to 36 in. with a lap splice. Quaker Rubber Div., H. K. Porter Co., Inc.

90—DISTRIBUTION TRANSFORMER is self-regulating

Designated SRT, this self-regulating distribution transformer senses voltage at the utilization level and maintains an average secondary voltage of 120 v by actuating a tap changer connected to the primary winding. SRT is described as a standard round-wound transformer with additional integral features to make it self-regulating. Regulation is accomplished by automatically changing the transformation ratio in 2-½ per cent steps over a voltage range of 10 per cent. Effective band width is 3-½ v centered around a base voltage of 120 v. With respect to rated primary voltage, the regulation range of 10 per cent can be manually selected to be from 90 to 100 per cent, from 95 to 105 per cent, or from 100 to 110 per cent. Operating features include a time delay which prevents hunting and unnecessary responses to momentary voltage fluctuations, and temperature compensation which provides reliable operation of the sensing mechanism over a temperature range of —40 C to 150 C. SRT will be marketed in limited quantities initially. Line Material Industries, McGraw-Edison Co.

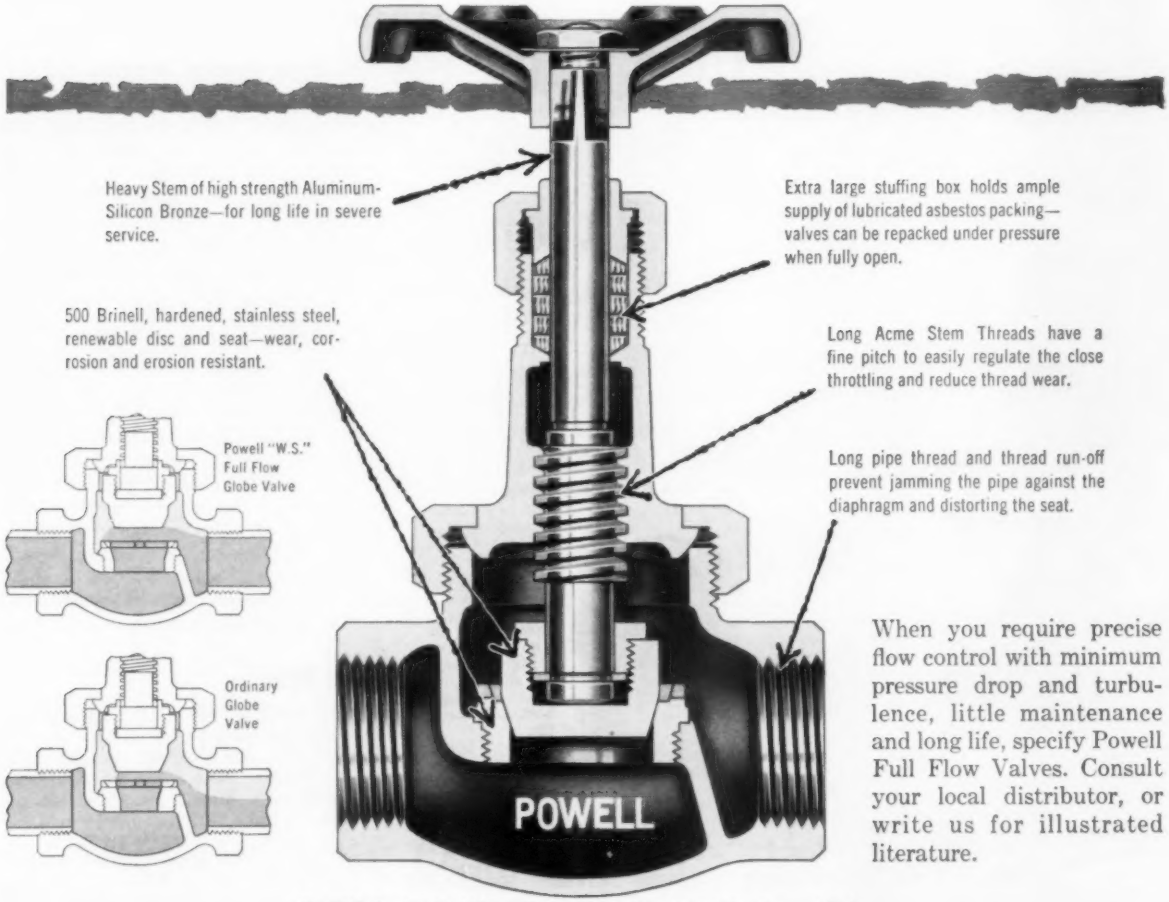
BULLETIN!

POWELL introduces new member in world's largest family of valves

Powell engineered "Full Flow" bronze valves are now available in a full line: the brand-new 150-pound screwed end Globe Valve, in addition to the well-known 200-300 pound Screwed and the 150-300 pound Flanged Globe and Angle Valves.

Although designed by Powell to assure maximum flow with minimum pressure drop and internal turbulence, these valves can be throttled to permit only the minutest amount of fluid to pass through. And, if desired, they can be supplied with Indicator Collar, Arm and V-port Disc for quickly determining flow and holding it constant.

Compare these advantages of Powell Full Flow valves:


Heavy Stem of high strength Aluminum-Silicon Bronze—for long life in severe service.
Extra large stuffing box holds ample supply of lubricated asbestos packing—valves can be repacked under pressure when fully open.
500 Brinell, hardened, stainless steel, renewable disc and seat—wear, corrosion and erosion resistant.
Long Acme Stem Threads have a fine pitch to easily regulate the close throttling and reduce thread wear.
Long pipe thread and thread run-off prevent jamming the pipe against the diaphragm and distorting the seat.
Powell "W.S." Full Flow Globe Valve
Ordinary Globe Valve
POWELL

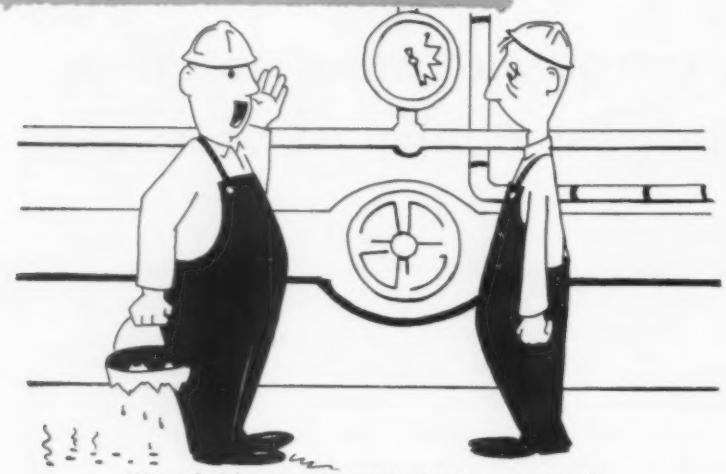
When you require precise flow control with minimum pressure drop and turbulence, little maintenance and long life, specify Powell Full Flow Valves. Consult your local distributor, or write us for illustrated literature.

Fig. 2600 (Sectional)—150-pound "W.S." Full Flow Globe Valve, Screwed Ends

THE WM. POWELL COMPANY • *Dependable Valves Since 1846* • **Cincinnati 22, Ohio**

For more facts circle 620 on Reply Card

Life in these excited states...



"I said, I borrowed a pail of acid... O. K.?"

ACE-ITE
all-purpose toughie

High-impact, rubber-plastic, most economical for average chemicals. ½ to 6". Screw or solvent welded fittings. Valves ½ to 2". NSF-approved. *Bul. 80A.*

ODD SHAPES?
you make...we line

Rubber or plastic lining is economical life insurance for costly "special" equipment. It's a specialty with ACE. Write for *Bul. CE-53.*

Time Can't Be Borrowed Either

Equipment running on borrowed time due to corrosion has a knack of dropping the bottom out of production when you can least afford it. No need to risk it . . . just specify Ace chemical resistant equipment. Best for the money anywhere . . . backed by 108 years' experience.

PLASTIC VALVES
for matched systems

Choice of Riviclor PVC, Ace-Ite rubber-plastic, Ace polyethylene or Ace Saran to match *any* plastic pipe. Sizes ½ to 2". Also larger plastic-lined valves.

PACHYDERMOUS PAIL

Ace-Hide, tough as a rhinoceros, insensitive to corrosives, makes this finest of acid pails. Also dippers, bottles, funnels, etc.

See our pages in ppc Catalog!

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
DIVISION OF AMERACE CORPORATION
Ace Road • Butler, New Jersey

For more facts circle 621 on Reply Card

NEW BOOKS

for the plant engineer

Welding and Cutting

SAFETY IN WELDING AND CUTTING. Size 9 by 6 approx.; 49 pp; paper bound. Published by American Welding Society, 33 West 39th St., New York 18, N.Y. Price $2.00.

THIS REVISED edition of AWS-ASA Z49 Standard includes material on gas, arc, and resistance welding equipment. It has pointers on personnel protection, fire prevention and protection.

The handling of fuel gas and oxygen cylinders are covered by numerous provisions. Some are mandatory, others are recommended as good practice. Requirements in the health protection and ventilation have been set on the basis of three factors, namely space dimensions, number of weldors, and hazardous atmospheres.

Plant Engineering, Maintenance

TECHNIQUES OF PLANT MAINTENANCE AND ENGINEERING. Size 11¼ by 8½ in. approx; 211 pp; cloth bound. Published by Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N.Y. Price $10.00.

EACH YEAR since 1951, proceedings of technical sessions held at the time of the annual Plant Maintenance and Engineering Show have been published in book form. The current volume reports on the 1958 discussions in Chicago.

Some of the subjects that were brought to the attention of conferees are as follows: labor relations in union and non-union shops, fundamentals of preventive maintenance, upkeep of electric motors, setting and maintaining sanitation objectives, broad responsibilities of plant engineering, and getting cooperation from maintenance employees.

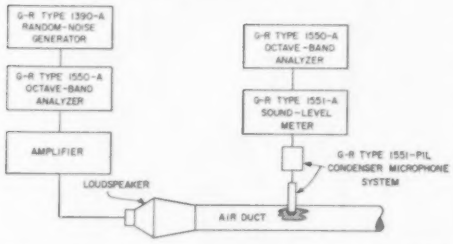
Fan Noise

CONTROLLING VENTILATION NOISES. Size 11 by 8½ in.; 50 pp; illustrated; paper bound. Published by DeBothezat Fans, Div. of American Machine and Metals, Inc., East Moline, Illinois. Price $2.00.

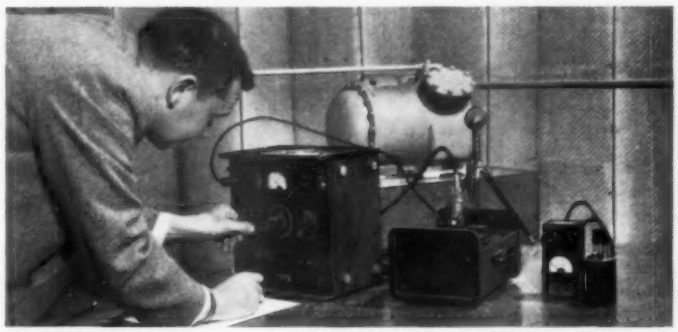
This booklet dwells briefly on the physics of noise encompassing a discussion on "live" and "dead" rooms. This physics portion dealing with basic terms is followed by sections on fan noise prediction, fan noise

How to TAKE THE NOISE out of MAN-MADE WEATHER

An acceptable air-conditioning system must be unobtrusive — it should not be obvious to the ear. Carrier Corporation, aware of the objections to air-conditioner noise, conducts a continuing development and evaluation program to minimize such disturbances. General Radio Sound-Measuring Equipment is used in all phases of this noise-control program . . . from the measurement of compressor and fan noise in large central-station installations to the measurement of noise produced by small room coolers.



Noise can be effectively reduced by proper design of system fittings. The block diagram shows a setup which is used to generate and measure air-duct sound-pressure levels. In this way, the amount of attenuation provided by the duct is determined. The Random-Noise Generator simulates fan noise, and the Octave-Band Noise Analyzer used with it provides the necessary filtering to remove extraneous background noise.

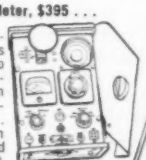


Here, sound produced by a hermetic reciprocating compressor is measured in a semi-anechoic sound room. Compressor noise is picked up by the microphone, amplified by the Sound-Level Meter, and fed to the Octave-Band Analyzer for broad-band frequency analysis. Also shown is the G-R Type 1307-A Transistor Oscillator and Type 1552-B Sound-Level Calibrator for convenient calibration of the complete Sound-Level-Meter System from microphone to meter.

Engineer measures over-all sound level produced by a Carrier Automatic Absorption Refrigeration Machine in central-station installation. This installation has 500-ton capacity and uses low-pressure steam to provide chilled water for the entire system.

The final verdict is made — sound from the Carrier Conduit Weathermaster System is measured and analyzed with the Sound-Level Meter and Octave-Band Analyzer. At Carrier, noise control is a very important part of product development . . . all Divisions and many field offices are equipped with G-R Sound-Measuring Instruments.

Type 1551-A Sound-Level Meter, $395 . . .

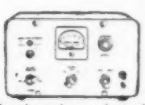


basic tool of the G-R Sound-Measuring Line . . . range is from 24 db to 140 db, and to 190 db with accessory high-level microphones . . . built-in weighting networks as specified in ASA standards . . . internal calibration system permits convenient, rapid standardization . . . light, dependable, compact, battery-operated, and completely self-contained.

Type 1551-P1L Condenser Microphone System, $330

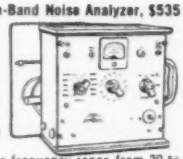
useful accessory for measuring sounds at the upper limits of the audible spectrum . . . measures levels up to 155 db.

Type 1390-A Random-Noise Generator, $240



generates wide-band random noises at uniform spectrum levels for acoustic measurements, noise-figure investigations, crosstalk studies, etc. . . . three ranges: 30c to 20 kc, 30c to 500 kc, 30c to 5 Mc . . . amplitude distribution of output closely approximates normal, or Gaussian distribution.

Type 1550-A Octave-Band Noise Analyzer, $535



(operates from Sound-Level Meter) . . . for rapid, accurate analyses of broad-band sounds whose sound energies are widely distributed over the audio spectrum . . . eight bands cover the frequency range from 20 to 10,000 cycles . . . valuable for determining noise spectra of vehicles and machinery, for measuring sound-transmission losses of building walls and for conducting speech-interference investigations.

GENERAL RADIO Company

275 Massachusetts Avenue, Cambridge 39, Mass., U. S. A.

NEW YORK AREA: Tel. N. Y. WOrth 4-2722, N. J. WHitney 3-3140 CHICAGO: Tel. Village 8-9400
PHILADELPHIA: Tel. HAncock 4-7419 WASHINGTON, D. C.: Tel. JUniper 5-1088
SAN FRANCISCO: Tel. Whitecliff 8-8233 LOS ANGELES 38: Tel. HOllywood 9-6201
In CANADA, TORONTO: Tel. CHerry 6-2171

GR 2-Year Warranty on every Product

Write for full information

Noise control is an important factor in product development — a noisy product meets sales resistance which may jeopardize its market position. If you have a noise problem, write for the G-R Sound Bulletin and complete facts on instruments for sound measurement.

For more facts circle 622 on Reply Card

Note imbedded Nylon plug – locks screw automatically
SEXAUER EASY-TITE
Note Fiberglas backing – resists closing squeeze

NEW WAY TO

Prevent Faucet Leaks!

★ 9 out of 10 washers are fastened with screws that are TOO LONG or SHORT. The screws quickly loosen; the loosened washers are destroyed thru grind and squeeze of opening and closing faucets.

34 years of research uncovers new solution

★ Now, NEW (Patented) 'Sexauer' SELF-LOCK Monel screws, with an imbedded expanding NYLON PLUG, lock at the required depth AUTOMATICALLY, hold washers FIRMLY! Made of rustproof, noncorreding Monel, heads don't twist off, screw slots don't distort. They are easily removed when necessary, can be re-used repeatedly.

★ Used with NEW 'Sexauer' EASY-TITE faucet washers, they make a combination that outlasts past faucet repairs "6-to-1"! EASY-TITES are made of super-tough, pliable du Pont compound (neither rubber nor fibre) and reinforced, like a tire, with a vulcanized layer of Fiberglas. They resist distortion and splitting from shut-off grind and squeeze.

Hidden costs of faucet leaks!

Faucet leaks are costly! As authenticated by Hackensack, N. J. Water Co. and American Gas Association, stopping just ONE PIN-HOLE SIZE (1/32") LEAK can reduce water waste 8,000 gal. quarterly. If a HOT WATER FAUCET LEAK, water and fuel savings JUMP to over $7.58 QUARTERLY—plus additional savings on MATERIALS, LABOR and costly FIXTURE REPLACEMENTS!

NEW SELF-LOCK screws and EASY-TITE faucet washers are just TWO of the "SEXAUER" line of over 3000 TRIPLE-WEAR plumbing repair parts and Pat'd. precision tools.

A "SEXAUER" Technician in your vicinity will make our NEW 126 page Catalog "H" available. He will gladly consult with you regarding a SURVEY of your plumbing fixtures to determine correct repair parts required and establish reasonable stock levels that avoid both overstocking and shortages—thus providing for efficient stock arrangement and control—all without obligation. WRITE TODAY!

J. A. Sexauer Mfg. Co., Inc., Dept. S-108
2503-05 Third Ave., New York 51, N. Y.
Gentlemen: *Please send me a copy of your NEW, 126 page catalog "H."*
My Name_____ Title_____
Company or Institution_____
City_____
Zone____ State_____

SEXAUER
WORLD'S LEADING SPECIALISTS IN PLUMBING AND HEATING REPAIR PARTS

For more facts circle 623 on Reply Card

NEW BOOKS

reduction and on sample fan noise calculations. Charts and tables are included in the publication.

Concrete Design

DESIGN OF CONCRETE STRUCTURES. Sixth edition; size 9¼ by 6¼ in.; 546 pp including index; illustrated; cloth bound. Published by McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, N. Y. Price $8.00.

IN THIS EDITION is a reflection of all changes introduced in the revision of the American Concrete Institute's Building Code issued in 1956. A drastic change is the admission of ultimate-strength design as a permissible optional alternate to conventional design procedures. An extensive new section deals with the ultimate-strength design method.

Some of the other sections include discussions on the following subjects: beams and slabs, footings, reinforced concrete buildings, retaining walls, columns, and prestressed concrete.

Valves

CONTROL VALVES by Chester S. Beard. Size 8¼ by 5½ in.; illustrated; 215 pp paper bound. Published by Instruments Publishing Company, 485 Ridge Ave., Pittsburgh 12, Pa. Price $2.00.

IF YOU ARE looking for a concise rundown on a variety of valve types, here is a book that can be a useful addition to your library. In this book the author discusses not only different basic types but also such topics as valve capacity, flow characteristics, positioners and actuators.

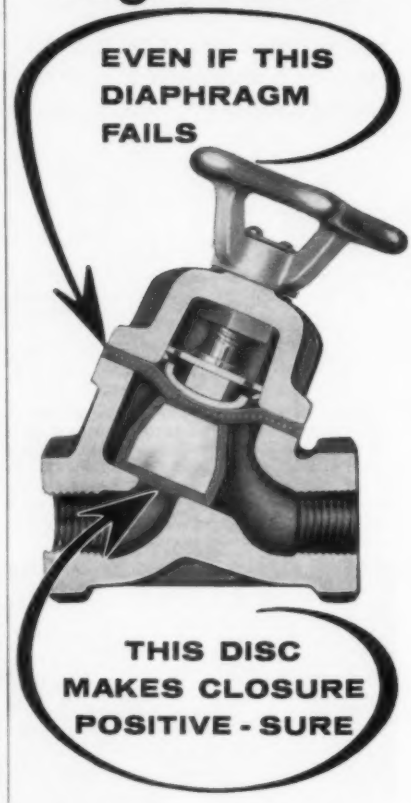
Facts on Plastics

CONCISE GUIDE TO PLASTICS by H. R. Simonds. Size 9¾ by 6¼ in.; 318 pp including index; illustrated; cloth bound. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y. Price $6.95.

FOR THE ENGINEER who wants to know the basic facts about the plastics industry, this is a good reference. Covering all the better known American plastics, some 30 types, the text answers questions on uses, properties, costs and sources of each.

Particularly helpful is the final chapter of the book, which lists alphabetically the multitude of trade names used in the plastics industry with a brief note about the composition of each, and its manufacturer.

CLOSES TIGHT *regardless*



With Rockwell "D-D" Diaphragm Valves, you don't depend on the diaphragm to seal and shut-off fluid flow. This is done by the tight seating disc which will always close even should the diaphragm rupture in corrosive, abrasive, vacuum or other service.

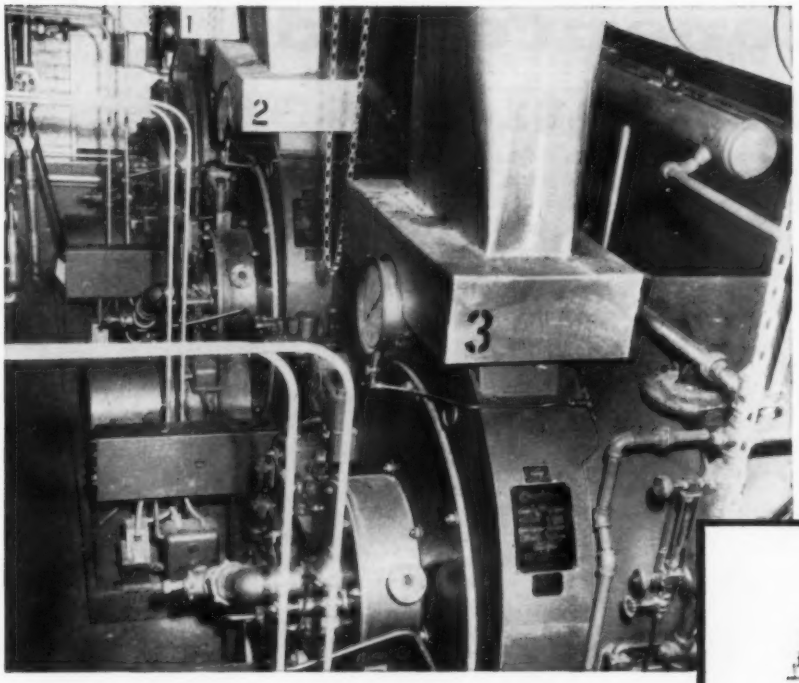
The diaphragm serves a single purpose: to seal the valve's operating mechanism. It can be replaced without removing the valve from the line.

Rockwell "D-D" Valves provide other advantages: low closing torque; low pressure drop; high capacity; minimum maintenance. Available with lined and unlined bodies; flanged, threaded or with union ends. Get Bulletin 800.

You're SURE - You're SAFE with **ROCKWELL "D-D" VALVES**

W. S. ROCKWELL COMPANY
2928 ELIOT STREET
FAIRFIELD, CONN.

For more facts circle 624 on Reply Card

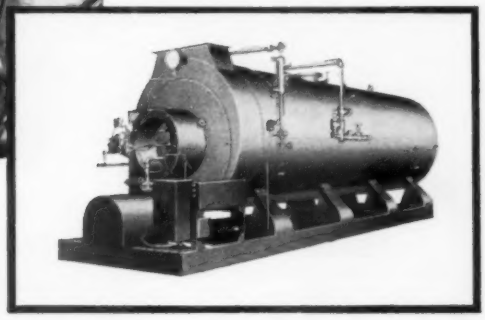


HERCULES-GALION PRODUCTS, Inc., Saves $15,000 Per Year!

Hercules-Galion Products, Inc., of Galion, Ohio, makers of dump truck bodies, ready-mix concrete truck equipment, and steel burial vaults, retired two old style boilers.

To improve heating efficiency, they installed three Cyclotherm 125 h.p. combination light oil/gas package steam generators. The total savings per year comes to $15,000.

As growing production or expanding plant facilities require more steam, Cyclotherms can be added when needed.



CYCLOTHERM

Steam capacity that grows with the plant!

When you recommend Cyclotherm Steam Generators you recommend a steam source that can be quickly and economically expanded to meet plant expansion. For Cyclotherm's wide range of capacities permits the addition of exactly as much new capacity as may be needed at any time. Will 518 lbs. of steam per hr. suit the requirements? That's what a 15 HP Cyclotherm produces. Or are 25,875 more steam lbs. per hour wanted? In that case, a 750 HP Cyclotherm fills the bill. And between these extremes there are sixteen intermediate sizes to choose from.

Compact Cyclotherms are also kind to boiler room space – the Cyclotherm is up to ⅓ smaller than the ordinary package boiler. Installation is easy—no costly stack, no excavation, no foundation. The Cyclotherm is shipped complete – ready to operate. Burner and boiler are built together to work together with *one* manufacturing responsibility back of the entire unit.

Cyclotherm's Cyclonic Combustion guarantees a minimum of 80% efficiency. Larger units operate at from 30% to 100% of rated capacity with no loss of efficiency. Smaller units operate on and off automatically according to load requirements. With simpler design and fewer parts, Cyclotherm reduces maintenance costs by from 30% to 50%. Cyclotherm's world-wide service organization gives prompt service on every call. For full information, write us today.

There are 18 Cyclotherm models, ranging from 15 HP to 750 HP. Burns oil and/or gas. The Cyclotherm meets all state requirements and is built in accordance with A.S.M.E. and National Board Standards and bears the label of Underwriters' Laboratories, Inc. Guaranteed against any defect in materials or workmanship. Cyclotherm also manufactures a complete line of Hot Water Generators in 10 capacities, from 670,000 BTU per hr. to 6,700,000 BTU per hr.

YEARS AHEAD IN STEAM & HOT WATER GENERATION

CYCLOTHERM®

STEAM AND HOT WATER GENERATORS

A Division of National-U.S. Radiator Corp., Oswego, N.Y.

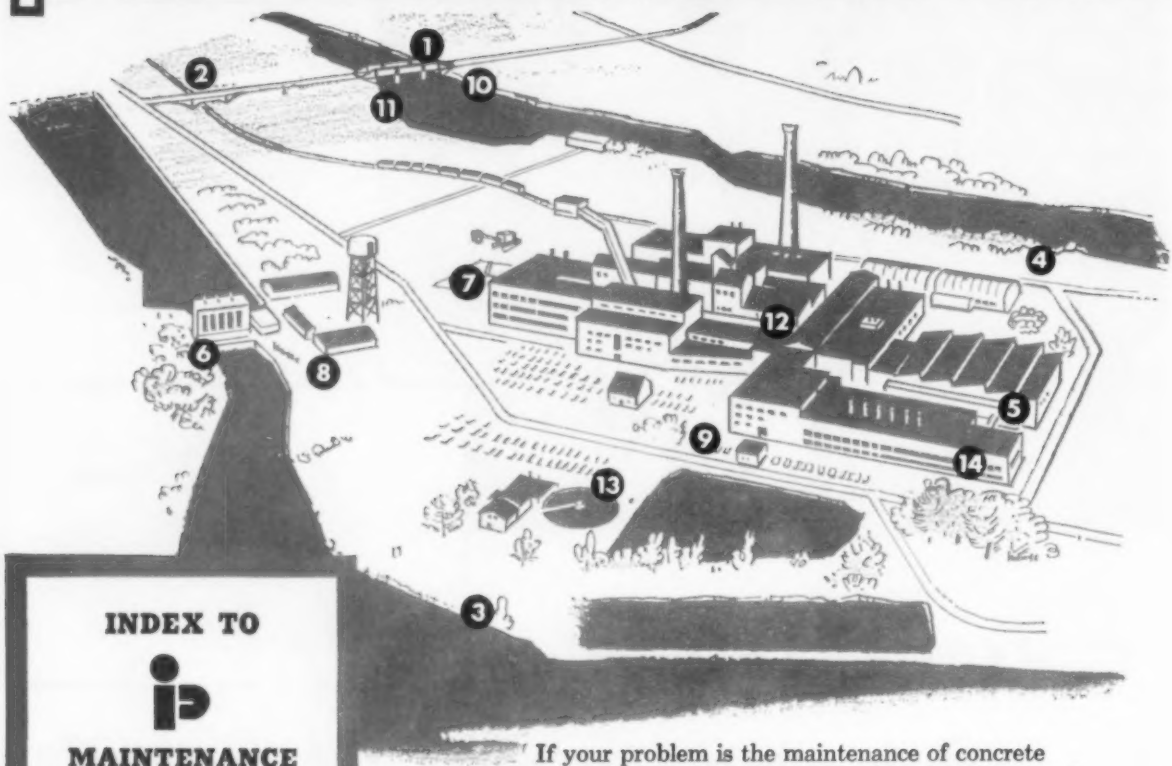
Clip to Your Letterhead

Cyclotherm Division
National-U.S. Radiator Corp.
54 E. First St., Oswego, N. Y.

Please send me your booklet *Cyclotherm Cyclonic Combustion*, also rotogravure copy of *Cyclotherm Sales Steam* with illustrations and descriptions of Cyclotherm installations.

For more facts circle 625 on Reply Card

maintenance and modernization services



INDEX TO

MAINTENANCE SERVICES

1. rehabilitating bridges
2. repairing lined and unlined tunnels
3. repairing seawalls, retaining walls, abutments
4. encasing deteriorated piles
5. stabilizing plant or machinery foundations
6. controlling leakage in dams and other hydraulic structures
7. placing bearing or cut-off piles **without vibration**
8. stabilizing poor bearing soils
9. sealing porous foundation material
10. grouting voids under piers, foundations, footings
11. correcting scour damage
12. reducing settlement of bases or foundations
13. repairing deteriorated concrete or masonry structures
14. repairing or releveling floor slabs

To receive a technical bulletin on I-P Maintenance Services, send request on your letterhead.

If your problem is the maintenance of concrete and masonry structures . . . or the stabilization of foundations and soils, you can get real help from INTRUSION-PREPAKT, INC.

INTRUSION-PREPAKT provides a comprehensive combination of maintenance services and has specialized in these for many years. This experience plus the superior results achieved with I-P methods and materials gives you a realistic way to stretch your maintenance dollars.

By using INTRUSION-PREPAKT services, you can repair structures instead of rebuilding . . . strengthen existing structural members . . . work in difficult locations . . . solve problems not feasible by conventional methods—all with minimum or no production interruptions.

On your next maintenance or modernization project, why not investigate the many advantages of working with INTRUSION-PREPAKT? For information, write: INTRUSION-PREPAKT, Inc., Room 568-P, Union Commerce Bldg., Cleveland 14, Ohio. In Canada: Intrusion-Prepakt, Ltd., 159 Bay St., Toronto, Ontario.

INTRUSION-PREPAKT, INC.

OFFICES IN PRINCIPAL U.S. AND FOREIGN CITIES

Intrusion and Prepakt are trade marks of Intrusion-Prepakt, Inc., whose methods and materials are covered by U. S. Patents Nos. 2313110, 2655004, 2434302 and others, also patents pending.

For more facts circle 626 on Reply Card

Problem Solving at Huntington Laboratories

SURGICAL SOAP PREVENTS DERMATITIS IN POULTRY PLANT

At a large poultry plant, as many as half of the chicken pinners were kept away from work because of hand infections.

Management desperately sought a solution. Their Huntington representative suggested they try Germa-Medica,® a medicated liquid soap used by surgeons before operations. The idea was novel but practical because Germa-Medica, with 3% Hexachlorophene puts an invisible anti-bacterial "layer" on skin that kills germs on contact. The suggestion was highly successful. Now absenteeism is less than 10%.

Do you have a sanitation or maintenance problem? The Man Behind the Drum could help you. He's your Huntington representative. Write for his name.

HUNTINGTON LABORATORIES
INCORPORATED
Huntington, Indiana • Philadelphia 35 • Toronto 2

HUNTINGTON
. . . where research leads to better products

For more facts circle 627 on Reply Card

INDUSTRIAL FILMS

Automation Data

ELEMENTS of a new two-part program, "Automating Electrically," are a 30-minute color, motion picture and a 44-page manual.

The film, titled "Automation and Mr. Halstead," dramatizes the need for keeping abreast of developments in electrical technology.

Recent electrical developments in 10 functional areas are outlined in the manual which has the title, "The Impact of Electrical Progress on Your Automation Planning."

These areas are power converting, power actuating, sensing, data presenting, regulating, data converting, data storing, programming, computing, communicating.

The film has been released in connection with their "More Power to America" program by the General Electric Co., Schenectady, N. Y.

Techniques of Welding Aluminum

TECHNIQUES that make welding of aluminum simple and practical are demonstrated in a new 33-minute full-color sound movie.

The 16-mm. film titled "Aluminum Welding . . . Different, Not Difficult," is available without charge for showings to business firms and interested organizations. A 28-page technical brochure of the same title which repeats and supplements the film, is provided for members of the audience.

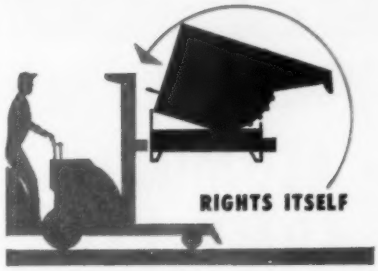
The movie shows that aluminum is easy to join by welding, brazing or soldering, although the techniques are different from those used with other metals. Animation is used to help make the technical presentation simple and interesting.

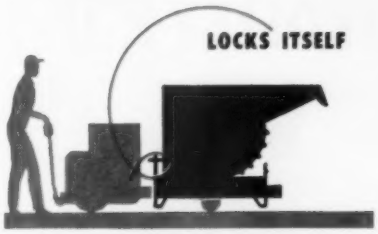
Requests for bookings of the film should be addressed to Reynolds Metals Company, Advertising Distribution Center, Richmond 18, Va.

Automated Diecasting

THE FIRST completely automatic diecasting machine for small and medium parts is explained in a new sound film entitled "Automation Comes to Diecasting." The 16mm film runs for 18 minutes, explaining the operation of the machine and showing them under normal working conditions.

For information regarding availability of the film, write to Department K45, DCMT Sales Corp., 80 Shore Rd., Port Washington, N. Y.





Cuts handling time . . . and costs . . . in half

Here's the fastest, lowest cost method ever devised for handling all kinds of bulk materials . . . hot or cold . . . wet or dry . . . such as:

Punch Press Parts . . . Cinders
Hot Forging or Castings . . . Scrap Metal
Pickles . . . Soybean Meal

A Roura Hopper fits any standard lift truck . . . attached or detached in seconds . . . can't slip off. One man does the entire job. Picks up loaded Hopper with lift truck . . . transports it to destination . . . flips the latch . . . and the Hopper automatically dumps its load, rights itself, locks itself. Cuts costs 50% or more.

They're sturdily made of heavy 3/16" steel plate with continuous arc-welded joints. Five sizes from ½ to 2 yards capacity. Fitted with live skids or a choice of wheels. Standard models available for immediate shipment from stock. For special applications they can be made of stainless steel or galvanized.

ROURA
Self-Dumping
HOPPER

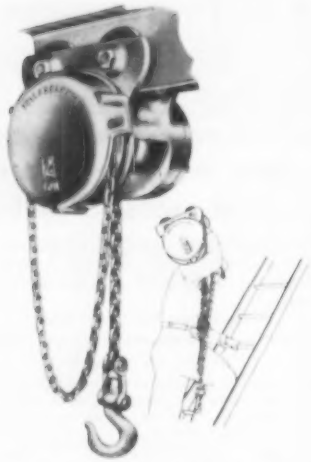
WANT MORE FACTS?
We'll give you full details . . . without obligation . . . if you'll attach this coupon to your letterhead . . . sign your name . . . and mail to . . .

ROURA IRON WORKS, INC.
1413 Woodland Ave., Detroit 11, Mich.

For more facts circle 628 on Reply Card

So LIGHT... and Yet So POWERFUL

"Philadelphia" ALUMINUM ARMY TYPE TROLLEY HOIST



Model "R". Originally developed for Government services to meet following requirements: Heavy duty yet light in weight; fully adjustable to wide range of I-beams and patent track monorail systems; less headroom than standard Army Type Hoists. Made of aluminum but available in spark-resistant metals. Readily convertible from push type to geared. All bearings have sealed-in, lifetime lubrication. Capacities: ½ to 2 tons.

Call Your Distributor or Write for Catalog

PHILADELPHIA CHAIN HOISTS

Philadelphia HOIST DIVISION

OF INDUSTRIAL ENTERPRISES, INC.

366 NORTH HAMILTON STREET

DOYLESTOWN, PENNSYLVANIA

NEW YORK • ATLANTA • CHICAGO • LOS ANGELES

For more facts circle 629 on Reply Card

AIPE Organizes New Chapters

(Continued from page 132)

eral one and two-day conferences on plant engineering practices.

One of these conferences was held at Calumet Center, Purdue University, in Hammond. It was initiated and partially arranged by the Calumet Chapter of the AIPE. Members of the Calumet Chapter who contributed to this seminar were: P. R. Janney, of Federated Metals, Division of American Smelting and Refining Co.; M. O'Hern, of American Steel Foundries; and O. J. Seidl, of Combustion Engineering, Inc.

W. A. Perry of Inland Steel Co. presented a talk on the subject, "The Maintenance Organization of a Large Industry." R. H. Morris, Editorial Director of Plant Engineering, and a past president of the AIPE, discussed "The Plant Engineer—Past, Present and Future."

Milwaukee Conference

Members from several of the chapters contributed their time and effort to the Plant Engineering Session of the 1958 SAE National Farm, Construction and Industrial Machinery Meeting. This was held in Milwaukee on September 8 to 11.

With S. A. Simonson, Chicago Hardware Foundry Co., AIPE president, serving as chairman, the following topics and speakers were presented: Machinery Acquisition and Replacement, by Otto Seidl, plant engineer, Combustion Engineering, Inc., Calumet Chapter member; Machinery and Equipment Maintenance, by K. N. Banthin, construction and maintenance supervisor, Visking Co., Div. of Union Carbide Corp., AIPE treasurer; Plant Layout, by W. C. Wallin, chief, plant engineering department, North Carolina Works, Western Electric Co., Inc., AIPE regional vice president; and Selling Maintenance Management to Top Management, by B. J. Robichaud, The Toni Company, president Twin Cities Chapter, AIPE. J. N. Jacques, Lakeside Laboratories, past president of Milwaukee Chapter, served as panel secretary. **End**

For profitable processing

Schneible Multi-Wash Collectors are a profitable investment in efficient processing, while improving your community relations.

In the industry, Multi-Wash Collectors are now performing essential production duties in cooling gases and condensing vapors. In addition, applications to profitable by-product recovery are commonplace.

Get new production efficiency with Multi-Wash. Write or wire for detailed information that applies to your problem.

SCHNEIBLE

Refer to Sweet's File No. 1e/Sc

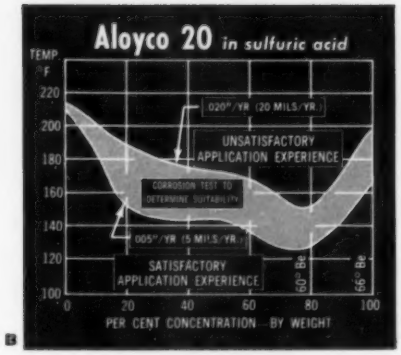
CLAUDE B. SCHNEIBLE COMPANY

P.O. Box 296 Roosevelt Pk. Annex

Detroit 32, Michigan • TAshmoo 5-7772

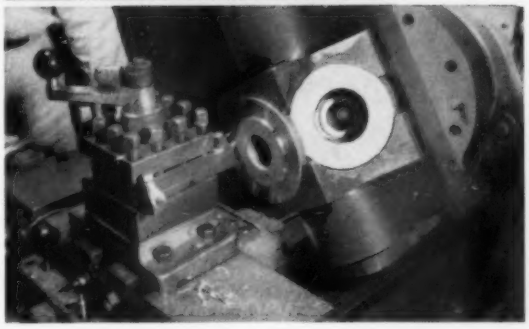
For more facts circle 630 on Reply Card

A



B

C



D

A. Your Problem in handling corrosives is discussed with a specialist when you sit down with an Aloyco Sales Engineer. He handles only one line, knows his business.

B. Right Alloy for your application is based on 29 years of specialized experience in the field plus continuing research in Aloyco metallurgical labs.

C. Valve Casting is made from Aloyco design in Aloyco foundry, only foundry ever built to produce pressure-tight Stainless Steel Valve castings, exclusively.

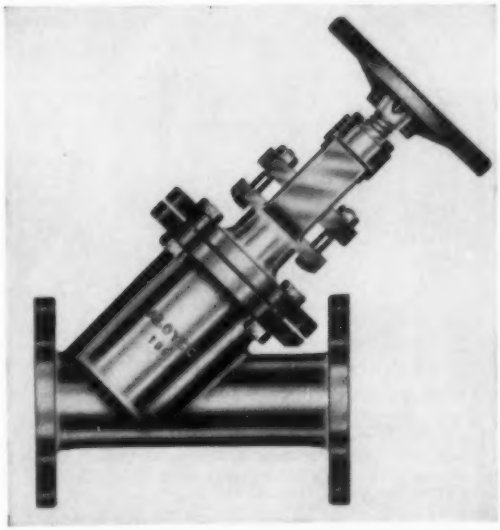
D. Special Techniques in machining stainless steel, plus most modern equipment in Aloyco plant assure you precise tolerances, trouble-free performance.

E. Aloyco Y Valve, shown here in various stages of production, is one of Aloyco's complete line of valve types, alloys, sizes, pressures — including nuclear valves.

BEHIND EVERY ALOYCO VALVE...

specialization

... to help you handle corrosives



E

Valves often look alike — even stainless steel valves. But they won't necessarily perform alike when you get them into the line.

Here are some of the special skills and facilities that make the difference between Aloyco valves and others. Some of the "extras" you get with Aloyco valves are staying power, minimum maintenance, trouble-free operation in severe as well as mild corrosive service. Doesn't it make sense that the one company specializing in the manufacture of Stainless Steel Valves exclusively is your best source of supply?

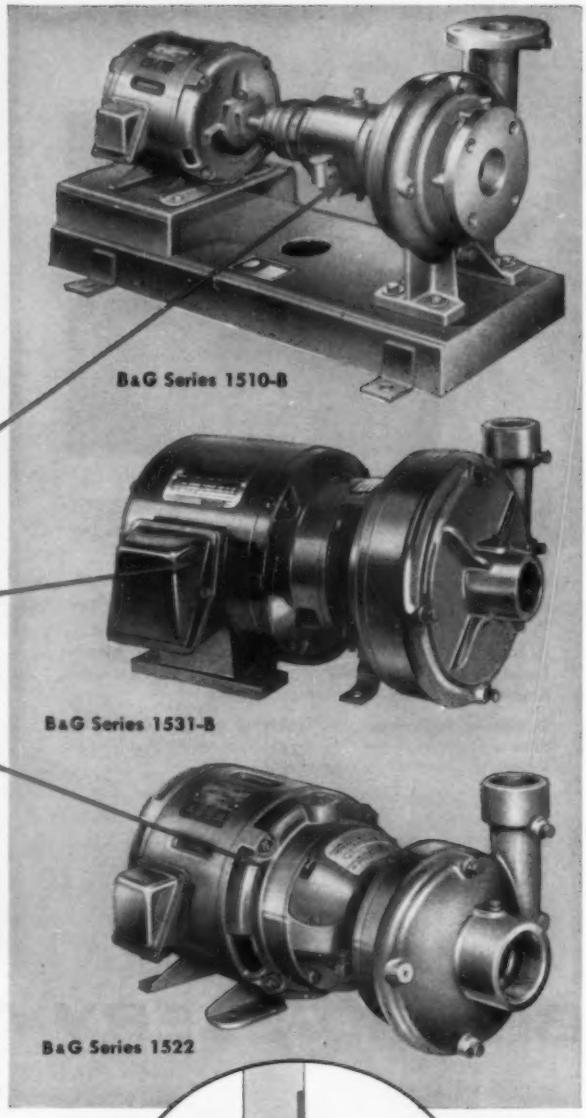
8.2

ALLOY STEEL PRODUCTS COMPANY

1308 West Elizabeth Avenue, Linden, New Jersey

For more facts circle 631 on Reply Card

WHEN YOU NEED A *GOOD* PUMP IN A *BIG* HURRY...



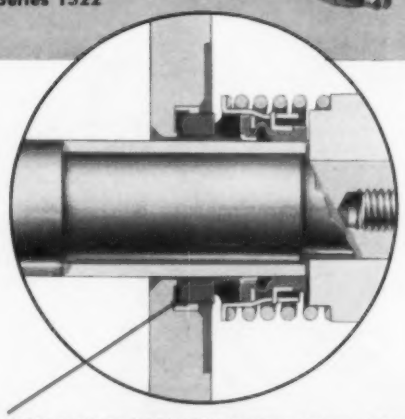
ORDER A B&G STOCK PUMP!

B&G maintains a factory stock of the most commonly used sizes of centrifugal pumps for immediate delivery. Base mounted and integral-motor pumps as listed in B&G Stock Pump Catalog are available in capacities to 325 GPM, heads to 140 ft.

Why B&G Centrifugal Pumps give years of trouble-free service is evident from their design features. Vertical split case construction permits removal of the bearing bracket without disconnecting pipe lines or motor leads. Special alloy steel shafts are super-finished and over-sized to keep deflection at a minimum.

Leak-proof operation is assured by the "Remite" Mechanical Seal—an exclusive B&G development. "Remite" is so hard it will cut glass—eliminates packing rings and gland adjustment. Seal is self-lubricating.

Send the coupon for catalog



LEAK-PROOF "REMITE" MECHANICAL SEAL

BELL & GOSSETT COMPANY

Dept. FL-53, **Morton Grove, Illinois**

Canadian Licensee: S. A. Armstrong, Ltd., 1400 O'Connor Drive, Toronto 16, Ontario

BELL & GOSSETT CO., Dept. FL-53, Morton Grove, Ill.
Please send a copy of the B&G Stock Pump Catalog CSP-257A.

Name .....

Address .....

City ..... *Zone* .... *State* .....

For more facts circle 632 on Reply Card

FIRST CLASS
PERMIT No. 11
BARRINGTON, ILL.

BUSINESS REPLY MAIL
No Postage Stamp Necessary If Mailed in the United States

Postage will be paid by

PLANT ENGINEERING

308 East James St.

BARRINGTON, ILLINOIS

OCTOBER, 1958
This card good only until
January 31, 1959

PLANT ENGINEERING

Please have manufacturers send without obligation information or bulletins indicated by numbers circled.

(Please print or typewrite)

Your Name..... Your Title .....

Your Company Name .....

Company Address..... City..... State.....

(Company name must be given. If you prefer delivery at home, also fill below)

Home Address..... City..... State.....

PRODUCTS

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49
50	51	52	53	54	55	56
57	58	59	60	61	62	63
64	65	66	67	68	69	70
71	72	73	74	75	76	77
78	79	80	81	82	83	84
85	86	87	88	89	90	91

BULLETINS

101	102	103	104	105	106	107	108	109	
110	111	112	113	114	115	116	117	118	
119	120	121	122	123	124	125	126	127	
128	129	130	131	132	133	134	135	136	
137	138	139	140	141	142	143	144	145	
146	147	148	149	150	151	152	153	154	
155	156	157	158	159	160	161	162	163	
164	165	166	167	168	169	170	171	172	
173	174	175	176	177	178	179	180	181	
182	183	184	185	186	187	188	189	190	
191	192	193	194	195	196	197	198	199	
200	201	202	203	204	205	206	207	208	
209	210	211	212	213	214	215	216	217	

DATA FILE

301	302	303	304	305	306	307	308	309	310	311	312	313	314	315
316	317	318	319	320	321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340	341	342	343	344	345
346	347	348	349	350	351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370	371	372	373	374	375
376	377	378	379	380	381	382	383	384	385	386	387	388	389	390
391	392	393	394	395	396	397	398	399	400	401	402	403	404	405
406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432	433	434	435
436	437	438	439	440	441	442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459	460	461	462	463	464	465
466	467	468	469	470	471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490	491	492	493	494	495

ADVERTISED PRODUCTS, SERVICES

501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532
533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564
565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596
597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628
629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692
693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724
725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756

Use this space to ask for tear sheets, other information wanted. .....

OCTOBER, 1958
This card good only until
January 31, 1959

PLANT ENGINEERING

Please have manufacturers send without obligation information or bulletins indicated by numbers circled.

(Please print or typewrite)

Your Name..... Your Title.....

Your Company Name .....

Company Address..... City..... State.....

(Company name must be given. If you prefer delivery at home, also fill below)

Home Address..... City..... State.....

PRODUCTS

1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	32	33	34	35
36	37	38	39	40	41	42
43	44	45	46	47	48	49
50	51	52	53	54	55	56
57	58	59	60	61	62	63
64	65	66	67	68	69	70
71	72	73	74	75	76	77
78	79	80	81	82	83	84
85	86	87	88	89	90	91

BULLETINS

101	102	103	104	105	106	107	108	109	
110	111	112	113	114	115	116	117	118	
119	120	121	122	123	124	125	126	127	
128	129	130	131	132	133	134	135	136	
137	138	139	140	141	142	143	144	145	
146	147	148	149	150	151	152	153	154	
155	156	157	158	159	160	161	162	163	
164	165	166	167	168	169	170	171	172	
173	174	175	176	177	178	179	180	181	
182	183	184	185	186	187	188	189	190	
191	192	193	194	195	196	197	198	199	
200	201	202	203	204	205	206	207	208	
209	210	211	212	213	214	215	216	217	

DATA FILE

301	302	303	304	305	306	307	308	309	310	311	312	313	314	315
316	317	318	319	320	321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340	341	342	343	344	345
346	347	348	349	350	351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370	371	372	373	374	375
376	377	378	379	380	381	382	383	384	385	386	387	388	389	390
391	392	393	394	395	396	397	398	399	400	401	402	403	404	405
406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432	433	434	435
436	437	438	439	440	441	442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459	460	461	462	463	464	465
466	467	468	469	470	471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490	491	492	493	494	495

ADVERTISED PRODUCTS, SERVICES

501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532
533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564
565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596
597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628
629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692
693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724
725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756

Use this space to ask for tear sheets, other information wanted. .....

FIRST CLASS
PERMIT No. 11
BARRINGTON, ILL.

BUSINESS REPLY MAIL
No Postage Stamp Necessary If Mailed in the United States

Postage will be paid by

PLANT ENGINEERING
308 East James St.
BARRINGTON, ILLINOIS

BULLETINS

(Begins on page 25)

148 Maintaining Electric Truck—Maintenance requirements of battery-driven fork trucks are detailed in recently published Bulletins 5996 and 6207. Step-by-step photos and instructions show recommended sequence for carrying out each of various maintenance operations in the stopwatch time cited. Exide Industrial Div., The Electric Storage Battery Co.

149 Vibratory Handling—Catalog 586 is a 64-pp, pocket-size condensed guide to manufacturer's vibratory bulk materials handling equipment and other products. Those listed include vibrators, packers and jolters, car rappers, hopper level switches, flow control valves, feeders, conveyors, elevators, screens, shakers, heating elements and panels, power tools. In addition to product illustrations, and specifications, catalog shows typical installations. Syntron Co.

150 Improved Caster—A caster design that substitutes a gyro-action bearing in place of a king pin and offers other new features is described in this 6-pp catalog. Presents six casters in the series with specifications, photos, drawings and applications. The Rapids-Standard Co., Inc.

MAINTENANCE

151 Floor Maintenance—This 32-pp booklet features recent developments in floor care, including information on various types of floors and recommendations on the proper treatment required for maintaining each type of floor. Among the types of floor surfaces covered are asphalt, rubber, vinyl, cork tile, wood, concrete, terrazzo and marble. Masury-Young Co.

152 Care of Hard Floors—Eight-pp "How to Finish and Maintain Hard Floors," covers procedures for terrazo, marble, concrete, magnesite and ceramic tile—and tells how to avoid problems. Booklet deals with such subjects as selection of cleaner, waxing of hard floors, regular maintenance of hard floors. Also answers questions on the care of particular types of hard floorings. Huntington Laboratories, Inc.

153 Steel Trestles—Catalog MR, 8 pp, features steel trestles and scaffolding accessories for use in painting, light construction and maintenance work. Photos, drawings and application views are included, as well as specifications. The Patent Scaffolding Co., Inc.

CONSTRUCTION

154 Watertight Masonry—Important elements involved in the design and specification of watertight masonry are discussed in this 6-pp bulletin. Citing good workmanship and lack of cracks between brick and mortar as principal pre-requisites, bulletin outlines six important considerations in designing walls. The Master Builders Co.

155 Fiber Glass Panels—Technical data and installation procedures for fiber glass reinforced plastic glazing panes are presented in this illustrated brochure. Outlines product's mechanical and physical properties and heat and light transmission. Filon Plastics Corp.

156 Heavy Duty Floor—How heavy duty industrial floors are finished or resurfaced with emery aggregate is described in 8-pp Bulletin 653. Specifications for preparing base slabs, mixing emery and cement and placing the mix for monolithic and granolithic finishes are included, as well as estimating data, tool and material requirements, tensile and compression ratings. Walter Maguire Co., Inc.

157 Grating and Treads—Catalog RSL-5, 16-pp, describes open floor grating and stair treads. Features product illustrations of rectangular grating with various wearing surfaces, Relgrit abrasive embedded non-skid grating, U-type grating, radial grating and other styles of treads. Engineering details, from panel sizes, weights and safe loads, to surface treatments and fastening discussed. Reliance Steel Products Co.

Tips on Selection and Use of Insulation

158 Data on Insulation—Tables and reference data commonly used by field workers in industrial insulation work have been compiled in this 22-pp handbook. Contents include definitions of terms, bare surface heat losses, effect of wind on insulated and bare surfaces, precalculated surface areas, complementary pipe insulation sizes, various conversion tables. The Aber Co.

159 Insulation for Buildings—This 12-pp booklet presents Fiberglas insulations for industrial and commercial metal buildings. Illustrates and describes use of Fiberglas flexible and rigid insulations. Discusses such factors as heat losses and condensation and such accessory materials as reinforced plastic paneling, ceiling board, acoustical tile, and perimeter and pipe duct insulation. Owens-Corning Fiberglas Corp.

160 Pipe Insulation—Advantages of lightweight glass fiber Micro-Lok pipe insulation are detailed in this 8-pp bulletin. Covers physical properties, thermal conductivity, types of jackets available, comparison of other insulation thicknesses required for equal efficiencies, guide to specifications for application and finishing. L.O.F. Glass Fibers Co.

PIPE AND TUBING

162 PVC Pipe—Sixteen-pp, Bulletin PVC-100, discusses selection and application of polyvinyl chloride pipe, tubing, and fittings. Illustrated with photos, charts and tables, it covers both normal and high-impact PVC. Includes comparative costs of PVC and comparable metal piping; mechanical, thermal and electrical properties; pipe and tubing specifications; and fitting types. Also provided are tables of corrosion resistance; charts of working pressure. Carlon Products Corp.

On the facing page are two postage-free Reader Service Cards provided for your convenience in ordering these bulletins. You may also use the cards to order any literature mentioned in ads.

163 Wrought Iron Tubing—Application of cold drawn wrought iron for heat exchanger and condenser tubes is discussed in this 10-pp bulletin. Cites installations in which use of wrought iron and other metal tubing in the same equipment permits service life comparisons. Listed are cost-per-foot-per-year figures for each material and corrosive conditions to which tubing was subjected. A. M. Byers Co.

164 Titanium Tubing, Pipe—Physical and mechanical properties, fabrication characteristics and corrosion resistance of titanium tubing and pipe are described in this 8-pp bulletin. Gives working instructions for machining, forming, welding, heat treating, and cleaning. Resistance of commercially pure titanium to 80 corrodents is shown. The Carpenter Steel Co.

165 Stainless Steel Tubing—Bulletin TB-415 explains how welded stainless steel heat exchanger and condenser tubes are made, and also points out fabrication and service advantages of fully annealed tubing. Tubular Products Div., The Babcock & Wilcox Co.

MECHANICAL POWER TRANSMISSION

166 Gear Drive Manual—Twenty-pp Bulletin 965 contains installation, operation and maintenance instructions for company's Type W gear drives, compact quiet-operating units adaptable to a variety of agitated reactions because of extended speed and power range. Engineering data includes dimensions, weights and rated capacities, detail drawings and parts list. Also given are instructions for dismantling the drive when equipped with rotary seal or stuffing box. The Pfaudler Co.

167 Roller Chains, Sprockets—Book 2657 contains 154 pp of engineering data illustrating roller chain's versatility in a wide range of applications. A practical textbook on the use of roller chain for both power transmission and conveyor service, book contains typical installation conditions, formulas, charts. Indexed for easy reference, it describes selection, application, installation, lubrication and maintenance. Also described are chain casings, lubrication and maintenance, sprocket engineering, leaf chains, roller chain flexible couplings. Available to qualified plant engineers; please state your job title when requesting this. Link-Belt Co.

168 V-S Drives—Bulletin D-2506, 16-pp, describes company's V-S drives, which provide adjustable machine speeds from in-plant a-c circuits. Discusses manufacture and functions of drive components including regulators, exciters, motor-generator sets, operator's panels. Includes photographs in

BULLETINS

(Begins on page 25)

color, diagrams, condensed drive specifications, dimensions and accessories. Reliance Electric and Engineering Co.

COOLING AND AIR CONDITIONING

169 Central Station Units—Described in 72-pp Catalog 39ACW-55 are central station Weathermakers for conventional and multi-zone applications. Details design features and includes mechanical specifications, general engineering data, unit size selection chart, DX entering wet bulb ratings, apparatus dewpoint charts, chilled water ratings, DX apparatus dewpoint ratings, hot water heating ratings, steam heating ratings, other data. Carrier Corp.

170 Packaged Chiller—Described in 6-pp Catalog EM-238 is the Turbopak, a packaged centrifugal chilling system. In addition to engineering specifications, sizes and weights, catalog provides comparison data on this and other centrifugal systems. York Corp.

171 For Economical Cooling—Twelve-pp Catalog S-395 describes features and applications of the Fluid Cooler, an air cooled heat exchanger. Two basic models—vertical or horizontal air flow—are covered, and additional information such as condensed equipment capacity and dimension tables, and descriptions of the basic components and accessories included. The Trane Co.

OTHER EQUIPMENT

172 Pressure-Sensitive Tapes—Over 435 pressure-sensitive tapes of many sizes, colors, and patterns for making graphs, charts, layouts, printed circuit drawings, map overlays, slides, and other presentations are illustrated in "Visualization Made Easier," 32-pp. Booklet includes step-by-step directions for making office and plant layouts, and organization and flow charts. Also describes grid sheets. Chart-Pak, Inc.

173 For Fire Fighting—Catalog L-1433, 16 pp, describes and illustrates industrial fire fighting equipment, including stationary and mobile industrial fire apparatus, all equipped with high pressure fog method of killing fires with minimum water damage. Complete capacity data and cutaway photos are included. John Bean Div., Food Machinery and Chemical Corp.

174 Centralized Lubrication—Bulletin 812 contains detailed information on centralized power lubrication systems. Illustrates and describes applications and advantages of the pumping units, complete with photos and drawings of installations. Also includes descriptions, specifications and dimensions of lubricant injectors used with the pumps, plus various controls and accessories. Lincoln Engineering Co.

175 Firebrick Data—Plant engineers, concerned with refractory maintenance and specifications will be interested in Bulletin R-52, a technical data card. Summarizes all of the technical data previously published by this company, and is printed on card stock and punched for notebook. Refractories Div., The Babcock & Wilcox Co.

176 Cement Pipe Lining—This 20-pp catalog describes a process of in-place centrifugal cement lining of pipes from 4- to 144-in. diam. Featured is a machine which centrifugally lines pipe as small as 4 in., and requires no excavation at laterals. Illustrates how process increases pipe carrying capacity, stops leaks in water and sewer lines, prevents corrosion in steel and cast iron pipe. Centriline Corp.

177 Oil Filters—Bulletin F-400 describes filters for full-flow filtration of diesel, gas engine, turbine, lubricating and hydraulic oils and for filtration of various industrial oils, fuel oil, solvents, coolants etc. Provides an easy-to-read data table for selecting proper filter. Specifications include maximum engine horsepower with proper filter listed, number of cartridges etc. Purifier Div., The Hilliard Corp.

178 Plastic Steel—Twelve-page Catalog NI-103 describes plastic steel and other products for the metal working, plastics, and other industries. Besides chemical and physical properties of these products, catalog also contains illustrated applications. Devcon Corp.

179 Process Equipment—Bulletin 968, a 12-pp illustrated buyer's guide to corrosion resistant process equipment includes information on all types of manufacturer's glassed-steel and alloy equipment. Among new products presented are reactors, flush valves and an electronic glass tester. Reactors, heat exchangers, evaporation equipment, tanks and process equipment are treated separately with description data on application, capacities and specialized function provided. The Pfaudler Co.

184 Liquid Ion Exchanger—This booklet provides 17 pp of technical details on Amberlite LA-1, liquid amine anion exchange resin. Nature and properties are discussed, along with details on handling and operational steps in use of the product. Among applications discussed are recovery and separation processes, purification of process streams, and pollution control. Resinous Products Div., Rohm & Haas Co.

185 Barometric Condensers—Twelve-pp Bulletin 5AA describes barometric condensers for removing air, exhaust steam and other vapors from vacuum equipment. Covers condenser theory, design features, construction, operation and application. Types described include multi-jet; multi-jet spray; multi-spray; and counter-current. Tables give sizes, dimensions and weights, and colored sectional drawings illustrate equipment and explain operation. Schutte and Koerting Co.

187 Processing Equipment—Bulletin 385, 25 pp, describes processing equipment for chemicals, food products and by-product recovery. From research to engineering and manufacturing, bulletin illustrates production facilities, and the variety of processing machines and vessels produced. Specifications and design data are given for evaporators and concentrators, recompression boosters, dryers, flakers and cooling drums, and special equipment. Buflovak Equipment Div., Blaw-Knox Co.

188 Fans, Cyclone Separators—Industrial fans and cyclone separators for use in connection with pneumatic conveying systems, are described in 20-pp Catalog Section 500-C. In addition to the description of fan types and their uses, it includes standard designations of fan assemblies, drawings of different standard fans, charts of dimensions of various fan sizes, charts of outlet velocities, and capacities as well as data on cyclone separators. Fort Worth Steel & Machinery Co.

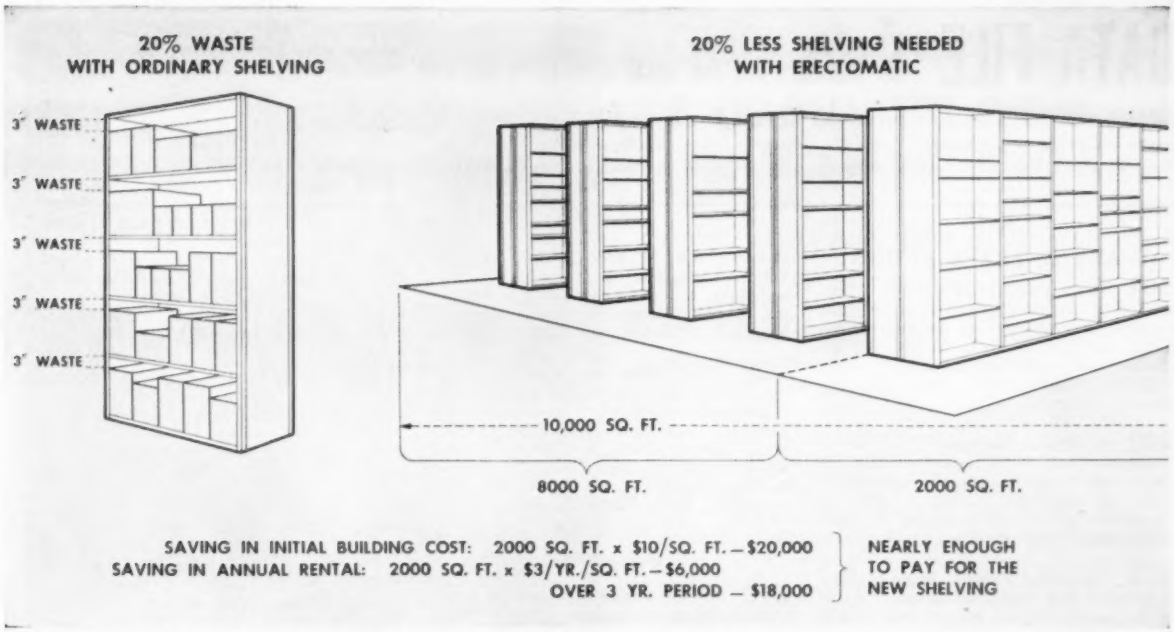
Among New Catalogs of Special Interest

180 For Better Drilling—A humorously illustrated "refresher course" in good drilling practice, "You're On The Road to Better Drilling" shows how improved precision and economy may be obtained in drilling operations. Spiral point drill geometry is explained and a handy record section is provided in which drill point angles, speeds, and other data can be jotted down. Cincinnati Lathe and Tool Co.

181 Heating Devices—Catalog GEC-10051 is a 52-pp 1958 guide on heaters and devices, and supplies answers for hundreds of heating problems besides clarifying ordering information. Information is included on pipe heaters, thermostatically controlled immersion heaters, 1-in. diam water immersion heaters, new ratings and configurations of tubular heaters, others. Heating processes are described in a power requirements section. Typical application problems are solved to give heating requirements. General Electric Co.

182 Applying Fasteners—Tips on applying standard fasteners are presented in a 16-pp illustrated pocket-size booklet. Information is contained on selecting right grade of bolt, proper torque for bolts, bolt stresses, calculating proper bolt loading, tightening limitations, safety factor, threads and protective coatings. Important data on nuts are also given. A section is devoted to selection of tapping screws; charts show safe load curves and torque curves for various bolts. Russell, Burdsall & Ward Bolt and Nut Co.

183 On Weed Killers—This little 12-pp booklet is a reference guide to weed and brush killers. Discusses several packaged, ready-to-use herbicide formulations for weed and brush control work. Amine salts, regular esters and low volatile esters of 23 specific formulations are summarized. Their particular applications for controlling broad-leaved weeds and clearing brush and plants cited. Diamond Alkali Co.


20% WASTE
WITH ORDINARY SHELVING
3" WASTE
3" WASTE
3" WASTE
3" WASTE
3" WASTE
20% LESS SHELVING NEEDED
WITH ERECTOMATIC
10,000 SQ. FT.
8000 SQ. FT.
2000 SQ. FT.
SAVING IN INITIAL BUILDING COST: 2000 SQ. FT. x $10/SQ. FT. — $20,000
SAVING IN ANNUAL RENTAL: 2000 SQ. FT. x $3/YR./SQ. FT. — $6,000
OVER 3 YR. PERIOD — $18,000
NEARLY ENOUGH TO PAY FOR THE NEW SHELVING

A typical example of the savings in space made possible by Hallowell ERECTOMATIC steel shelving is illustrated above.

8000 square feet of Hallowell *ERECTOMATIC* Steel Shelving can hold as much as 10,000 square feet of ordinary shelving

Reduction in floor space and shelving is made possible by quick-change shelf positioning and exclusive corner post construction, permitting more effective utilization of area between shelves.

More effective utilization of the area between shelves can provide major savings in industrial and commercial shelving installations—whether you own, rent, or are planning to build the area required for storage.

Hallowell ERECTOMATIC® Steel Shelving permits such utilization. Quick-change shelf positioning eliminates waste in vertical spacing, increases the usable storage area by as much as 20%. Exclusive corner post construction permits full utilization of shelf width, too. Typical savings in initial building costs and annual costs are listed in the tables opposite. Ask your authorized Columbia-Hallowell dealer for details.

Or write Columbia-Hallowell Division, SPS, Jenkintown 26, Pa. or SPS Western, Santa Ana, Calif.

SAVINGS IN INITIAL BUILDING COSTS
(per 100 sq. ft. of storage space eliminated)

% floor space saved by ERECTOMATIC	Building cost per 100 sq. ft.								
	$700	800	900	1000	1100	1200	1300	1400	1500
5	$ 35	40	45	50	55	60	65	70	75
10	70	80	90	100	110	120	130	140	150
15	105	120	135	150	165	180	195	210	225
20	140	160	180	200	220	240	260	280	300

SAVINGS IN ANNUAL COST
(per 100 sq. ft. of storage area saved)

% floor space saved by ERECTOMATIC	Cost (per year) per 100 sq. ft.									
	$100	200	300	400	500	600	700	800	900	1000
5	$ 5	10	15	20	25	30	35	40	45	50
10	10	20	30	40	50	60	70	80	90	100
15	15	30	45	60	75	90	105	120	135	150
20	20	40	60	80	100	120	140	160	180	200

SPS

Jenkintown • Pennsylvania

Standard Pressed Steel Co. • The Cleveland Cap Screw Co. • Columbia Steel Equipment Co. • National Machine Products Co. • Nutt-Shel Co. • SPS Western • Standco Canada Ltd. • Unbrako Socket Screw Co., Ltd.

For more facts circle 633 on Reply Card

DATA FILE of literature for the plant engineer's library

STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent data file. To get these catalogs, circle item numbers of those wanted on postage-free cards provided for you on pages 211-212.

VALVES, TRAPS, PIPING

301 Valve Performance Facts — Included in this 36-pp booklet are 32 case histories of cost-saving valve installations. Service applications covered include steam, oil, water, coating fluid, chlorine, phenol, pulp stock, vacuum, others. Crane Co.

302 Corrosion-Resistant Valves — Eight-pp Bulletin 7 contains complete engineering specifications for company's corrosion-resistant valves, as well as photos of individual types in the line. Alloy Steel Products Co.

303 Industrial Valves—Bulletin 507V illustrates and describes company's line of industrial valves for control of air, gas, liquids and solids. Features photos and descriptive detail on a variety of valves, including butterfly valves, wafer butterfly valves, slide valves, others. W. S. Rockwell Co.

304 Plug-Type Valves — Long-life features of company's stainless steel plug-type valves are stressed in 6-pp Form 202-A. Cutaway view illustrates important design and operation features. Jenkins Bros.

305 Blow-Off Valves—Bulletin B427, 20 pp, describes features and advantages of company's blow-off valves for boiler pressures up to 415 lb. Covers construction details, materials used in the valves, and includes specifications, weights and dimensions, tables of average physical and chemical properties of materials, photos of typical installations, etc. Yarnall-Waring Co.

306 Steam Trap Book — Catalog J. 44 pp, serves as a manual on trapping practices. Includes a catalog section giving physical data and prices on cast semi-steel and forged steel inverted bucket steam traps, compound steam traps, and ball float air and air relief traps. Handbook section tells how to calculate condensate loads, and select traps for each class of equipment, and a maintenance section covers trap installation, trouble-shooting and repair. Armstrong Machine Works.

307 Glass Pipe and Fittings — Corrosion-resistant qualities of this Pyrex brand glass pipe and fittings which make it suitable for use under corrosive conditions are described in 44-pp Bulletin PE-3. Operating temperatures, physical characteristics, installation procedures are covered and specifications and dimensional drawings given. Corning Glass Works.

308 Wrought Iron Pipe—This 8-pp booklet on wrought iron OD piping documents some 20 typical commercial and industrial installations. These case histories show wrought iron's durability under a variety of operating conditions. ASTM specifications under which the type is manufactured by this company are contained in booklet, as are photo-micrographs showing the physical structure. A. M. Byers Co.

309 UPVC Pipe, Fittings—Technical data and installation information on unplasticized polyvinyl chloride pipe are provided in 24-pp Booklet TTP119. Also gives specifications for threaded and socket types of UPVC fittings, valves and flanges, of normal and high-impact material. Tube Turns Plastics, Inc.

FILTERS

310 Filters, Strainers — Industrial Catalog 1058, 48 pp, provides application and engineering information on company's line of micro-filters and precision strainers. Fuel filters, full flow and by-pass lube filters, dry type air filters, air separators, and metal edge strainers for fuel lube and industrial use shown. Purolator Products, Inc.

311 Intake Filters—Eight-pp Bulletin 100 describes a line of intake filters for internal combustion engines, compressors, blowers, motors and generators. Standard, silencer and ground level installation models are covered, and tables of sizes, and selection chart are included. Dollinger Corp.

312 Filters for Industry—This loose-leaf notebook contains a series of bulletins with detailed information and specification data on filters, aftercoolers and cyclone separators. Among those featured are Bulletin 17 on air filters, Bulletin 431 on filters for the chemical process industries, Bulletin 650 on general service filters and Bulletin 711 on cyclone separators and pipe line aftercoolers. R. P. Adams Co., Inc.

ELECTRICAL

313 Fan-Cooled Motor—Illustrations and description of company's totally enclosed fan-cooled electric motors are featured in Bulletin 827. Cutaway views show features. Brook Motor Corp.

314 Totally-Enclosed Motors — Bulletin 500-A describes company's totally-enclosed, fan-cooled motors in ratings from ½ to 40 hp. Ratings and dimensions listed. Robbins & Myers, Inc.

315 Secondary Unit Substations—Bulletin 9004-A, 20 pp, describes lower cost, complete flexibility and space saving of secondary unit substations. Photos and charts of construction are provided, also standard KVA ratings covering all types of indoor and outdoor units. I-T-E Circuit Breaker Co.

316 Electrical Equipment Digest—Electrical equipment illustrated and described in 160-pp Catalog Digest 141 includes load centers, circuit breakers, low voltage control, fusible service equipment and accessories, meter sockets and troughs, safety switches, panelboards, duct and fittings, starters, other equipment. Square D Co.

317 Conductor Systems—This 36-pp catalog describes the Insul-8-Bar systems of mobile safety electrification for cranes, monorails and moving machinery. Includes photos and descriptions of typical installations, engineering data, installation procedure, a photo-text list of items that comprise these systems. Insul-8-Corp.

318 Trolley Busway Systems—Bulletin 70 offers help on electrical installations involving cranes and hoists, assembly and production lines, moving test lines and other moving electrical equipment. Covers 225- to 250-amp systems, 100-amp systems and 60-amp systems. Includes special sections on installation planning. Feedrail Corp.

319 Varnished-Cambric Cables—Bulletin VC-56-10M, 22 pp, covers varnished-cambric cables in a voltage range of 600 to 5000 v for single and three-conductor cables braided or lead sheathed. Armored cable constructions in both galvanized steel armor and aluminum armor are shown. Rockbestos Products Corp.

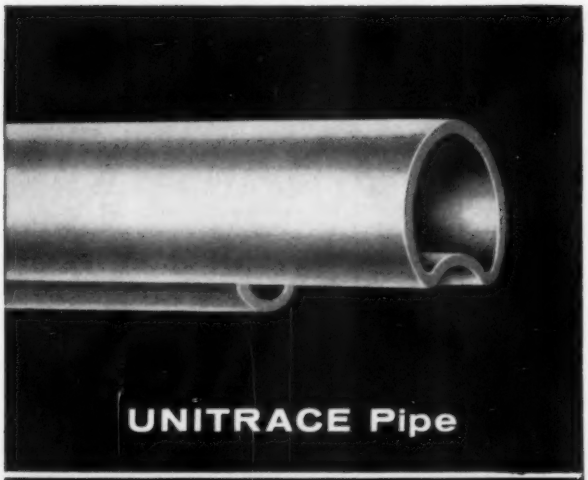
320 For High Voltage Cable—Test results and service records on an improved butyl rubber compound for high-voltage cables are announced in 12-pp Bulletin EB-27. Covers resistance to ozone, operating temperature, high-voltage, dielectric strength, aging, insulating resistance, moisture absorption. Anaconda Wire & Cable Co.

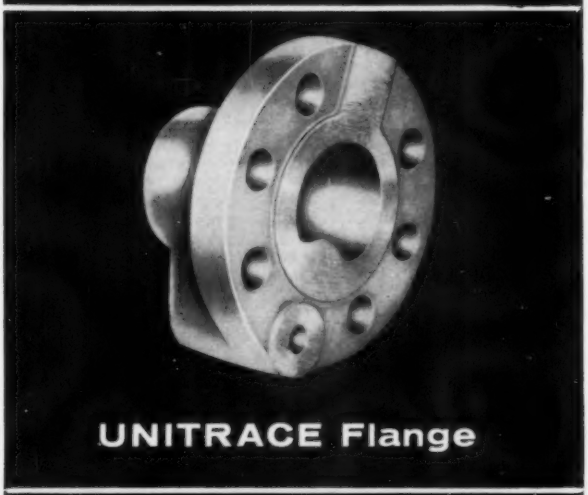
321 Wires and Cables—Interlocked armored cable, supports and fittings designed for low cost, heavy duty industrial, power or control wiring are described in this 24-pp bulletin. Photos and specific descriptions of various types of armored cables available for voltages through 15,000 v, single and multi-conductor are included. National Electric Products Corp.

322 Protective Relays — Featured in 16-pp Catalog 5-020 are time delay overcurrent relays, directional inverse time overcurrent relays, differential relays, instantaneous overcurrent relays (adjustable setting), inverse time voltage relays, auxiliary relays, ac-dc definite time relays, and reclosing relays. For each model, tabular data and photos cover its applications, features, design, settings, burdens at 60 cycles, contacts, and case. Federal Pacific Electric Co.

323 Enclosed Switches—Catalog 83, 28 pp, and Catalog 101, 20 pp, describe enclosed switches for industrial uses. Included are general switches designed for use on either a-c or d-c applications, sealed switches, heavy-duty limit switches, hand operated switches, and maintained-contact switches. Micro Switch, Div., Minneapolis-Honeywell Regulator Co.

324 Battery Users Manual—Motive-power battery maintenance and repair is detailed in this newly revised edition of company's Battery Users Manual





Only **ALCOA** offers a complete new **UNITRACE** system

to cut costs and raise efficiency of steam-traced piping

Users of steam-traced pipe have found that valuable savings in cost plus greatly improved efficiency are automatic when they use ALCOA® UNITRACE. It provides steam and product passages extruded in a single unit of light, strong, corrosion-resistant aluminum alloy... completely eliminating the need for costly external steam jackets or inefficient tracer tubes. Now a new flange and trace cap provide fittings and connections designed for UNITRACE which are compatible with conventional piping. You can now design completely integrated UNITRACE piping systems and get all these benefits:

Low heat loss... high internal heat transfer
The recently introduced *round* configuration of UNITRACE makes possible most efficient internal heat transfer with minimum external radiation loss.

Easy, economical joints and connections
The special UNITRACE Flange mates with all 150-lb ASA flanged connections, permits use of standard flanged valves or other flanged connections. And the new UNITRACE Trace Cap permits quick, easy assembly of cross or tee connections.

Uses standard, preformed pipe insulation
The efficiency of UNITRACE often makes insulation unnecessary. When it *is* needed, standard preformed insulation can be used. UNITRACE saves extra dollars by employing smaller diameter insulation than conventional systems.

Excellent corrosion resistance
Thanks to the natural corrosion resistance of aluminum, UNITRACE is ideal for handling naval stores, molten sulfur, ammonium nitrate solutions, glacial acetic acid, fatty acids, tar, pitch, wax, urea, and similar products requiring heated transfer lines.

ALCOA UNITRACE and matching fittings are available in four standard pipe OD's: 1½", 2", 3" and 4". Get complete details on how you can use them to raise efficiency and lower cost on your own heated transfer lines. Call your nearest Alcoa sales office or write Aluminum Company of America, 889-K Alcoa Building, Pittsburgh 19, Pa.

Write for this FREE BOOKLET
This fully illustrated booklet contains complete engineering, specification and fabrication data on ALCOA UNITRACE. Write for your free copy!

ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA

"ALCOA THEATRE"
Exciting Adventure
ALTERNATE MONDAY EVENINGS

For more facts circle 634 on Reply Card

DATA FILE

(Begins on page 216)

(Bulletin GB-1599A), 44 pp. Developed as a result of in-plant training courses, this book is designed to enable plant engineers to conduct an organized battery training course. Gould-National Batteries, Inc.

325 Oil-Tight Pushbuttons — Illustrated in full color, 30-pp Publication EL-178 presents company's line of oil tight pushbuttons, indicating lights, selector switches, Roto-Push buttons, covers and enclosures and accessories. All models are pictured along with selection charts, ordering information. Cutler-Hammer, Inc.

326 Switch Wiring Diagrams—Bulletin 709 is a 36-pp booklet of typical wiring diagrams for across-the-line starting switches. Indexed and arranged for easy use, this booklet serves as a guide to some of the many ways in which this company's manual and magnetic across-the-line starters can be applied. Allen-Bradley Co.

327 Fuses for All Uses—This revised edition of manufacturer's complete line, Folder 3, includes illustrations and descriptions of fuses for every purpose. Features dual-element cartridge fuses for time-lag in protection against overloads, and delay renewable fuses and renewal links. Economy Fuse & Mfg. Co.

328 Cable Supports—This information folder contains data on company's cable supporting equipment, telling how to install cable supports, as well as giving advantages of cable trough. T. J. Cope Div., Rome Cable Corp.

LIGHTING, COMMUNICATIONS

329 Illumination Design Data—Basic reference data on interior lighting installations is contained in 48-pp Manual A-4854, which features a section describing footcandle levels required for each group of seeing tasks. These footcandle levels are then related to many kinds of rooms and areas. Westinghouse Electric Corp.

330 Architectural Floodlighting—Eight-pp Bulletin GEA-6437 illustrates various methods of floodlighting industrial plants, public and commercial buildings and others. Provides information on general purpose heavy-duty floodlights. General Electric Co.

331 Lamps for Industry—Eight-pp Bulletin 88 presents manufacturer's line of lamps for industrial service, indoors and outdoors. These include mercury vapor lamps, weatherproof floodlights, high bay reflector lamps, spotlights, infra-red lamps, spatter-proof lamps, and others. Illustrated with photos, bulletin includes curves indicating candle-power. Radiant Lamp Corp.

332 Lighting Components—This catalog sheet shows a cross section of lighting components and assemblies manufactured by the company. Among equipment covered are standard, spring mounted indicator and warning lights, socket assemblies, and plunger switches. John W. Hobbs Corp., Div. Stewart Warner.

333 Lighting Equipment—Bulletin 2697, 52 pp, contains detailed information on a line of lighting equipment, including floodlights, searchlights, industrial lighting and fixture condulets. Two new items—mercury vapor floodlights and vapor master lighting fixtures—are covered. Crouse-Hinds Co.

334 Lighting Standards — The 1958 Edition of the RLM Standard Specifications Book, a reference guide for industrial lighting units, has been strengthened in the areas of efficiency, design and construction quality. New specifications are also included covering two- and three-lamp special service fluorescent units, three types of units utilizing 800 ma fluorescent lamps, new incandescent reflector sizes, and mounting specifications for fluorescent units. RLM Standards Institute.

INSTRUMENTS, CONTROLS

336 Pressure Gages—In 16-pp Catalog 305 are described gages, with and without integrated switches, used most widely in operation of power and steam plants, refrigeration systems, metal working industries, hydraulic presses, and others where steam, water and non-corrosive oils and gases are principal measured media. Specifications included. United States Gauge, Div., American Machine and Metals, Inc.

337 Gages, Needle Valves — Catalog 76-G consists of a loose-leaf bound collection of literature on gages and needle valves. Various types of gages are illustrated and described, with applications and specifications fully detailed. A section on accessories is included. Jas. P. Marsh Corp.

338 Motor Speed Controls—Eight-pp Form 927B features motor speed controls for adjustable-speed operation of d-c motors from a-c lines. Applications and advantages are listed, operating principle is detailed, and specifications given. General Radio Co.

PUMPS, COMPRESSORS

339 Sewage Pumps—Twelve-pp Bulletin 7500 illustrates heavy-duty wet and dry pit sewage pumps, small vertical sewage pumps and standard and submersible cellar drainers. Includes performance tables for selecting pumps, dimensional drawings and details of construction. The Deming Co.

340 Solids Handling—Bulletin 121-A, 8 pp, describes non-clog pumps for handling solids in suspension. Included are vertical, horizontal and close-coupled types used to handle liquid components of industrial processes, industrial waste, and for such pumping applications as water supply, drainage and sewage handling. Aurora Pump Div., The New York Air Brake Co.

341 General Purpose Pumps—Section B, 36 pp, describes rotary pumps for general purpose use. Explains positive displacement principle incorporated, gives suggestions for selecting proper materials of construction. Application and ordering information is provided on mounted and unmounted small pumps, large mounted pumps, pumps for operations requiring greater sealing, and large, totally enclosed models. Viking Pump Co.

342 Solids Handling Pump—Bulletin P10-B26 describes the principle and effect of a torque-flow pump for all phases of the sewage treatment operation. Stresses non-clog features of this pump. Photos illustrates handling of raw sewage, raw sludge, digester recirculation and grit handling. Western Machinery Co.

343 Pump Data—Featured in Bulletin 250 are centrifugal pumps, reciprocating pumps, screw pumps and rotex pumps designed for pulp and paper, boiler plants, marine, chemical, food, pipeline, textile and other applications. Typical applications for each pump in the line are listed, as well as range and construction. Warren Pumps, Inc.

344 Blowers and Pumps — Blowers, gas pumps and vacuum pumps are described and illustrated in 8-pp Bulletin S-59F. Text covers characteristics of operation, construction, and types of drive. Also provided are details on relief valves, timing gears and thrust bearing assembly. Standard blower dimensions are charted as are performance examples for low, medium and high pressure blowers. Sutorbilt Corp.

345 Liquid Ring Pump — Bulletin 725.6 describes light weight, self-priming, portable or permanent liquid ring pump for transfer and similar jobs, which handles air alone, liquid alone or any air-liquid combination. Specifications, performance and construction data are included. Gould's Pumps, Inc.

346 Air Compression for Industry—This is a 24-pp combination data book and catalog on all types of air compressors from ½ hp to 20 hp. Discusses factors to be considered in the use of air for each operation, and points out importance of determining how much usuable air is needed. The Wayne Pump Co.

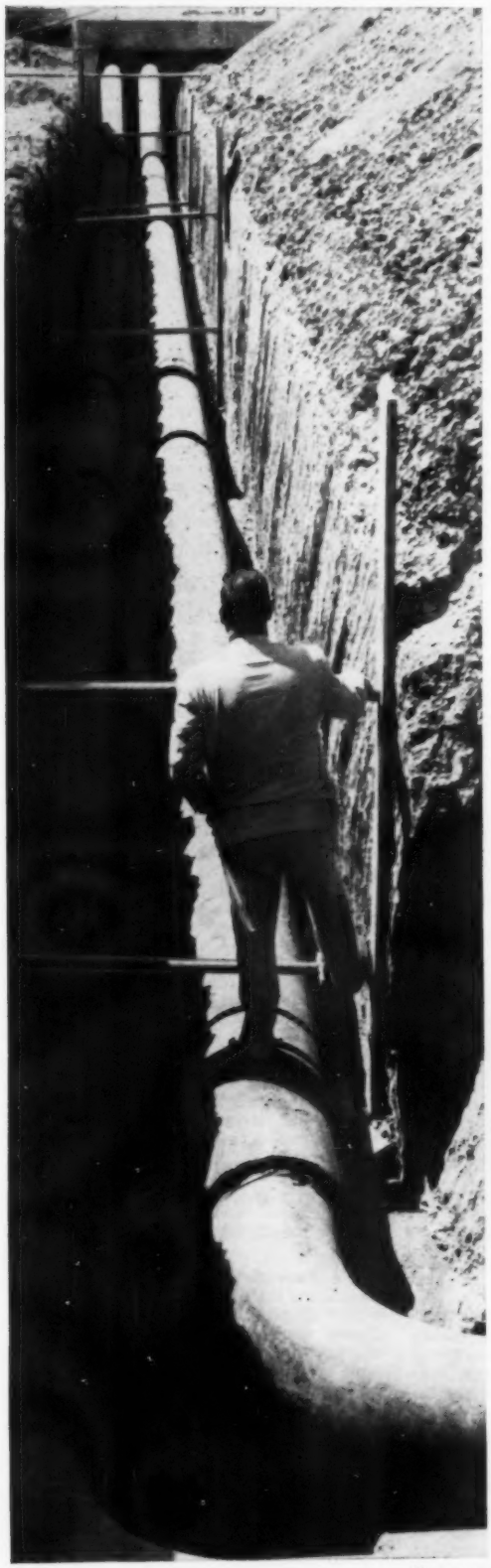
347 Industrial Air Compressors—Advantages of company's line of industrial air compressors are detailed in 16-pp Catalog 5510. Tables indicating weights, code words and dimensions are included, as well as cutaway views showing design and operation details. Compressor specifications are given, and dimensional diagrams and other material included. Schramm, Inc.

PACKINGS, SEALS

348 Braided Packing — Form AD-131, 8 pp, describes lattice braid packings designed for longer service life and lower maintenance. A table of general recommendations gives essential data, and a table of lengths and weights is included. The Garlock Packing Co.

349 Rotary Seal Data—Plant engineers concerned with process equipment will find it easy to select the right type of mechanical seal for a specific

FOAMGLAS® INSULATION / waterproof, vapor-proof, strong, can't burn, acid-proof, vermin-proof, dimensionally stable



IBM buried its piping problems and saved 50% on installation— thanks to FOAMGLAS insulation

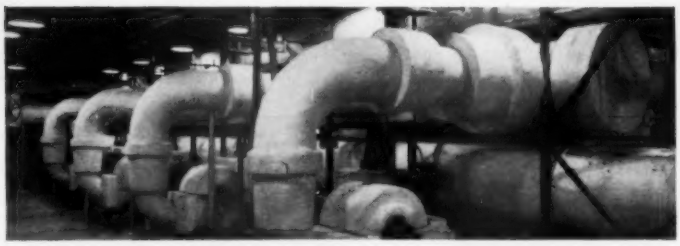
FOAMGLAS insulation makes installing underground piping simpler, less costly. Here's a case in point.

International Business Machines Corporation buried over 7,000 feet of chilled water piping—part of the central air conditioning system at its new San Jose, California, plant. Insulating the piping with Pittsburgh Corning's moisture-proof FOAMGLAS—the unique cellular glass insulation—cut their installation costs in half. Here's how.

Because it is completely impervious to ground water and soil acids, FOAMGLAS will maintain its original insulating value . . . protecting IBM's steel pipe against corrosion. This fact made direct burial of the insulated pipe practical. There was no need for a costly protective concrete tunnel or a pre-sealed conduit to house the pipe. Either would have boosted installation costs from 200% to 300%. FOAMGLAS eliminated this extra cost.

FOAMGLAS is the most dependable—and often the least costly—solution to *your* insulation problems . . . for exposed or buried piping, equipment and plant structures. Write for complete information in our latest industrial catalog.

PC Glass Blocks are another outstanding building product of Pittsburgh Corning Corporation.



Above ground FOAMGLAS insulation insures constant thermal efficiency on IBM's chilled water lines.

Below ground piping gets two-in-one protection—against heat gain and against corrosion—from the sealed glass cells of FOAMGLAS.

PITTSBURGH CORNING CORPORATION

Dept. PE-108, One Gateway Center, Pittsburgh 22, Pa.

In Canada: 57 Bloor Street West, Toronto, Ontario

For more facts circle 635 on Reply Card

42 ft. x 75 ft. pole-type building.
Erection cost, $1.65 a square foot.

pole-type INDUSTRIAL buildings *Are Flexible...*

They are easily expanded or extended to follow your company's growth. Poles carry the load; walls can be easily modified to meet your special requirements. And keep in mind that pole-type buildings

- **Are quick and easy to erect**
- **Economical**
- **Require no foundations**
- **No special fabrication**
- **Are good looking; attractive**
- **Maintenance free**
- **Last a lifetime**

Before you build, investigate this fast, modern, low-cost building method. Perhaps you may save half, or even more, on the cost of a conventional structure.

For full particulars mail the coupon today—

KOPPERS POLES

C-15

Wood Preserving Division
Koppers Company, Inc.
786 Koppers Building
Pittsburgh 22, Pennsylvania

Send full information on Pole-Type Industrial Buildings to:

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

For more facts circle 636 on Reply Card

220

DATA FILE

(Begins on page 216)

operating condition with Form 480, a 16-pp, catalog on rotary mechanical seals. It is extensively illustrated with cutaway views showing stuffing box installation details. Durametallic Corp.

350 Piston Packing—Sixteen-pp Bulletin 5503 presents engineering data on Darcova Pumcups for packing pistons of air cylinders, hydraulic cylinders and reciprocating pumps. Included are operating diagrams and a list of typical installations, as well as helpful data on Pumcup compositions, textures and types made available for specified pressure and other corrosive conditions. Darling Valve & Mfg. Co.

MECHANICAL POWER TRANSMISSION

352 Dry Fluid Drive—Illustrated Bulletin A-665 describes the new fhp Flexidyne and coupling, announced as incorporating all advantages found in the larger sizes of this dry fluid drive. Includes tables listing motor and shaft sizes with which they may be used, also starting horsepower ratings for various speeds. Dodge Mfg. Corp.

353 On Drive Selections—Steps in selecting a heavy duty V-belt drive are outlined in 16-pp Bulletin DH-301. Service factor table, design horsepower table, minimum installation allowance table and complete selection tables are included. The Gates Rubber Co.

354 V-Belt Economy — Disadvantages of makeshift and other ill-advised means of coping with stretched or broken V-belts are discussed briefly in this folder. Answers questions on V-belt maintenance, inventory, wear. The Manheim Mfg. & Belting Co.

355 On V-Belts—Testing, inspection and control of V-belts is covered in this 16-pp booklet. Describes in words and pictures how raw materials and finished belts are tested and inspected. One section explains quality control procedures, and another section is concerned with experimental production. Goodyear Tire and Rubber Co.

Postage-free cards for ordering catalogs are on page 212. You may also use the cards to order literature mentioned in the ads.

356 Ball Bearing Trolley—Book 2536, 20 pp, describes a ball bearing trolley engineered for overhead conveyors. Features are shown on a large cutaway view and selection tables are included, as well as photos, dimensional diagrams. Link-Belt Co.

357 Flexible Couplings — Condensed Engineering Catalog 51-A contains excellent data on the choice and use of company's flexible metal couplings for power transmission. Tells advantages of these couplings and discusses design. Thomas Flexible Coupling Co.

BOILERS AND GENERATORS

358 Package Boilers — This 12-pp booklet on package steam generators describes the formulas behind all package steam generators and illustrates how installation of a package steam generator can raise steam capacity in an existing boiler room without extensive structural changes. Cyclotherm Div., National-U. S. Radiator Corp.

359 Self-Contained Boilers—Bulletin AD-162, 8 pp, describes company's complete line of self-contained boilers for heating and processing steam or hot water. Design features and advantages are detailed and a cutaway view showing flow of air in the forced draft system is included. Cleaver-Brooks Co.

360 Package Unit Steam Generators —Bulletin PSG-2 has line drawings, photos, and engineering data on portable type units from 10,000 lb/hr to 40,000 lb-hr steam capacities. These units are available in three standard pressures of 175, 250, and 375 psi gage. Henri Vogt Machine Co.

CONSTRUCTION

361 Aluminum Building Products—This 36-pp catalog covers company's line of aluminum industrial building products. Cites advantages of aluminum, pictures some installations. Installation data, weights, dimensions and rough-in details are provided on corrugated roofing and siding, V-beam roofing and siding, ribbed siding sheet, perforated corrugated sheet, flat flashing sheet. Aluminum Co. of America.

362 Replacement Glazing — Twelve-pp Booklet PL-251 gives detailed information on glazing industrial and other buildings with flat panels of the acrylic plastic, Plexiglas. Written for plant engineers concerned with frequent breakage of windows or other glazing problems, this practical booklet gives properties of this sheet. Plastic Dept., Rohm & Haas Co.

363 Building Panels, Panes — Form SL-3, 8 pp, presents Structoglas A reinforced plastic corrugated building panels and flat panes, giving information on product's mechanical and physical properties, chemical resistance, colors and finishes. Installation instructions cover sidewall mounting, roof construction. Structoglas Div., International Molded Plastics, Inc.

364 Face Brick — Brochure B-158 contains a set of 24 color reproductions which illustrate the wide range of glazed and unglazed facing brick for all types of interior and exterior walls. Also included is detailed information regarding size, color and availability of various types. Natco Corp.

365 Foundation Pipe Piles—Comprehensive information on Taylor Forge spiral-weld foundation pipe piles is presented in a 24-pp Form F-5677. In addition to detailed specifications, the illustrated booklet describes a number

HOW DO YOUR CLEANING COSTS STACK UP AGAINST JENNY'S ?

40-Ton Toggle Press	3 Hours
Automatic Screw Machine	5 Hours
Steel Mill Windows, per 30 panes	15 Minutes
Garage Floors, per 30 sq. ft.	10 Minutes
Machine Shop Floors, per 15 sq. ft.	15 Minutes
8-Ton Woodworking Machine	2 Hours
Overhead Crane Rail Girders, per 6 ft. section	15 Minutes
Pipe Threading Machine	30 Minutes
Small Drill Press	20 Minutes
Railroad Tank Car	2 Hours

meet Jenny . . . the girl with the magic touch

Jenny® SERIES 1800 STEAM CLEANER

Maintenance superintendents report that Hypressure Jenny cuts cleaning time to one-tenth the time required by ordinary methods. Reduces down-time to a minimum. Regardless of how large or how small your cleaning job, there is a Hypressure Jenny to fit your requirements. In addition, the revolutionary Jenolizing process prevents rust after steam cleaning. Write for details now.

SERIES 1800 . . . one of 80 different models and types.

HOMESTEAD VALVE MANUFACTURING COMPANY
Hypressure Jenny Division • Coraopolis, Pennsylvania

Please send me information on "How Industry Gets More Productive Hours" with Hypressure Jenny Steam Cleaners. 207

Name_____

Street_____

City_____ Zone____ State_____

For more facts circle 637 on Reply Card

OPEN-END V-BELTS and ALLIGATOR® FASTENERS

OPEN-END V-BELTING ASSURES YOU OF . . .

- Far less stretch than other "connected type" belting.
- Top drive performance — greater traction surface between drive belt and sheave.

Also, you can simplify the replacement of worn or damaged V-Belts . . . make up special size V-Belts quickly . . . and keep costly "downtime" at a minimum (no need to dismantle machinery).

ALLIGATOR V-BELT FASTENERS

Provide one strong joint . . . easy to install . . . terrific holding power . . . designed for minimum flexing of V-Belt traveling around sheave.

ORDER FROM YOUR DISTRIBUTOR OR WRITE TO . . .

Flexible
STEEL LACING COMPANY

4616 LEXINGTON ST. • CHICAGO 44, ILL.

For more facts circle 638 on Reply Card

DATA FILE

(Begins on page 216)

of pipe-pile installations and includes driving logs. L. B. Foster Co.

366 Steel Floor Plate—Skid resistance and other advantages of USS multigrip rolled steel floor plate are stressed in this illustrated bulletin. Also gives dimensions, data on allowable loads. United States Steel Corp.

367 Non-Slip Flooring — Algrip, an abrasive rolled steel floor plate described as non-slip even on steel inclines, is the subject of Booklet AL-29, 8 pp. Discusses safety features, fabricating. Alan Wood Steel Co.

SLINGS, CHAINS, WIRE ROPE

368 Wire Rope Manual—"Inspection of Wire Rope," "Methods of Lubricating Wire Rope," "Use and Abuse of Wire Rope," and "Sheave Maintenance" are among subjects covered in this 188-pp Wire Rope Manual, Catalog G-16. In addition, there are sections devoted to strengths and weights of wire rope, cable assemblies, and rated capacity of slings. Manual is available to qualified plant engineers. Macwhyte Co.

369 Wire Rope Selection Tips—This 16-pp illustrated booklet, "How To Be A Wire Rope Expert," describes basic principles governing selection of proper rope construction. Describes five factors to be considered and shows how these can be balanced for best possible efficiency regardless of application. Also illustrated is a device called the D/d ratio for determining best relationship of rope size to sheave or drum size. Popular wire rope constructions are described, applications listed. Leschen Wire Rope Div., H. K. Porter Co., Inc.

370 Self-Lubricating Chain—Bulletin SLC-57 describes and illustrates exclusive, oil impregnated sintered bushing design feature of company's self-lubricating roller chain. Engineering data, dimensions and application reports are included. Whitney Chain Co.

371 Drop Forged Fittings—Comprehensive data on company's line of drop forged fittings for wire rope and chain are presented in 40-pp Catalog 950-2. Includes specifications, dimensions, rated capacities and weights. Also announces range of sizes and capacities in many of items listed, as well as new products, including clips. Crosby-Laughlin Div., American Hoist and Derrick Co.

MATERIALS HANDLING

373 For Overhead Handling—Booklet 2008-M, 12 pp, is replete with illustrative material on principal components of overhead handling systems. Track design and advantages of supporting it flexibly are described, and formulas and figures for comparing various track systems are included. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

374 Overhead Dispatch System—Form F 192, 8 pp, describes an automatic overhead dispatch system designed to solve a variety of materials handling problems. Outstanding advantages are listed and typical installations are described and illustrated with detailed diagrams. Component equipment utilized in this system is described. Richard Wilcox Mfg. Co.

375 Traveling Cranes—Motor driven traveling cranes designed to handle a variety of industrial operations are described in 20-pp Catalog 62. Crane specifications are included, as well as clearance dimensions and other data. Reading Crane & Hoist Corp.

376 On Chain Block Safety—This wall chart illustrates safe handling of chain blocks. Sketches cover nine principles of handling, showing what should always be done and what should never be done. Reverse side of the chart gives data on blocks and trolleys. Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc.

377 Electric Hoists—Twelve-pp Bulletin DH 133B describes Speedway electric hoists of 500- to 4000-lb capacities. Fully illustrates and explains design features and gives details on suspensions and conducting systems. Clearance data included. Wright Hoist Div., American Chain & Cable Co., Inc.

378 Electric Hoists — Six-pp illustrated Bulletin 905 describes R&M Type J electric wire rope hoists in capacities of ¼, ½, 1 and 2 tons. Shows complete specifications including mounting options and sectional drawing. Hoist & Crane Div., Robbins & Myers, Inc.

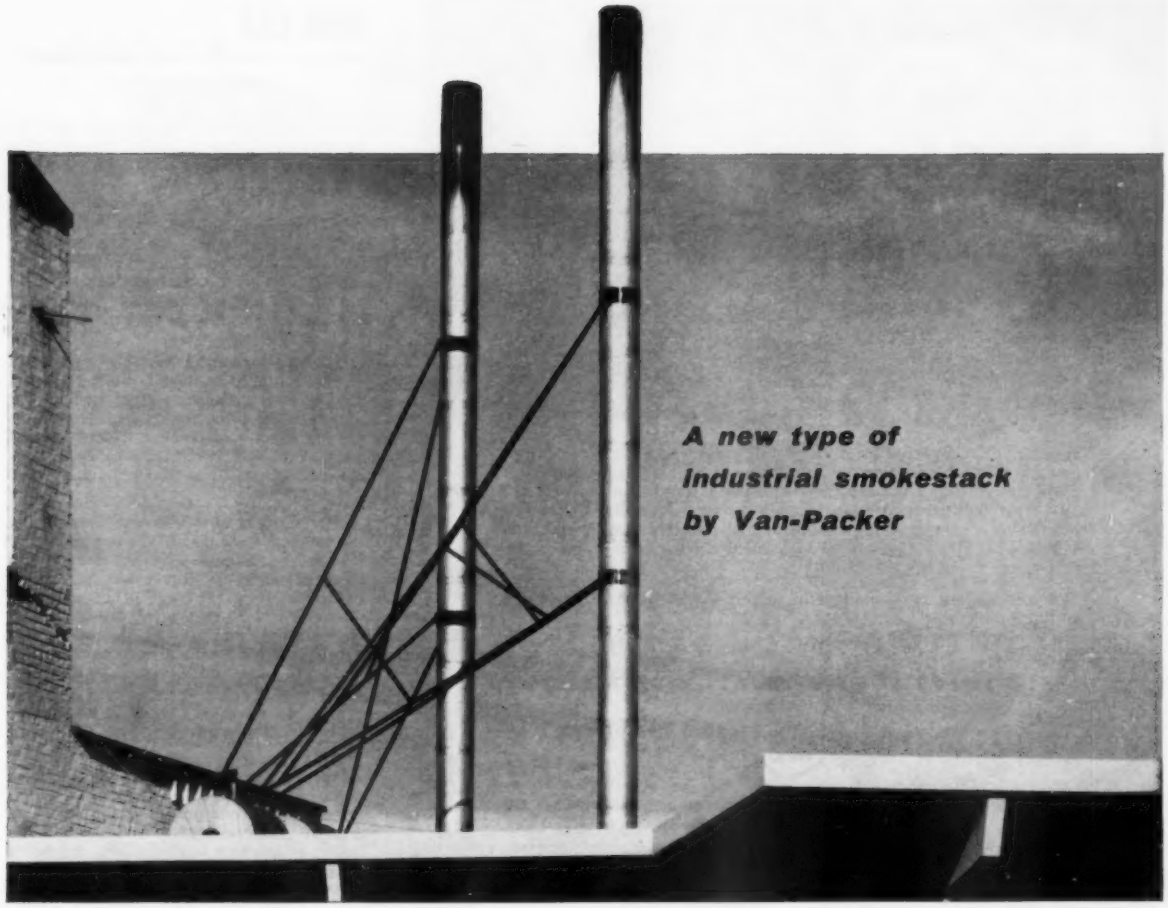
379 Sheet and Coil-Lifters—Bulletin SL-30, 16 pp, illustrates and describes various types of standard and semi-special lifters for one-man or automatic handling of sheet and coil stock. Advantages and design features are detailed and tables listing dimensions included. Cullen-Friestedt Co.

380 Vertical Transportation — Selection of vertical transportation for every traffic-moving job is detailed in 32-pp Bulletin A-382. Various types of elevators and escalators for a variety of commercial and industrial applications are described and dimensional diagrams illustrating arrangements included. Recommended sizes and capacities are listed. Otis Elevator Co.

381 Adjustable Ramps—Engineering details and other information on use and installation of company's hydraulic adjustable ramps for loading docks are featured in this illustrated bulletin. Two types of dock equipment are treated—the Adjust-A-Dock, installed in the loading platform or at its level, and the Adjust-A-Truck, installed at ground level. Rowe Methods, Inc.

382 Steel Conveyor Belts—"A profitable approach to the selection of steel processing conveyor belts" is the subject of this 16-pp bulletin. Simplified selection, standard specifications, and installation information are included. The Colorado Fuel and Iron Corp.

383 Belt Idlers — Eight-pp Bulletin 925 tells the story of company's belt idlers from development to installation. Outlines double flexible diaphragm seal



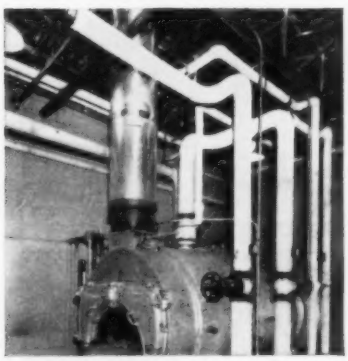
Get longer stack life at lower cost

Permanent construction — Because the Van-Packer is made of non-corroding refractory material it will outlast a steel stack as much as three times. The aluminum jacket which encases each stack section eliminates maintenance.

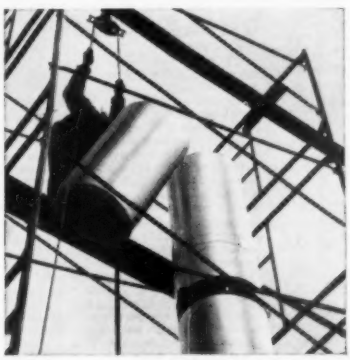
Low Cost — The Van-Packer costs no more than a steel stack, and only 1/3 as much as brick. Other savings result from fast installation, savings on maintenance, and long life. Handles all fuels for boilers, furnaces, incinerators.

Prefabricated refractory sections—Centrifugally-cast 3-foot sections combine the economy of a steel stack with the permanence and high draft of a brick stack. Seven diameters from 10-inch ID to 30-inch ID.

Available nationwide — Van-Packer Stack is available through local Van-Packer Jobbers and Special Representatives. See "Chimneys — Prefabricated" in Yellow Pages, or write Van-Packer for Bulletin IS-58.



Van-Packer Stack with Standard Sections handles boilers and furnaces efficiently. Can be superimposed or floor supported.



Installing this stack is quick and easy. Three-foot sections are simply cemented atop one another with acid-proof cement.

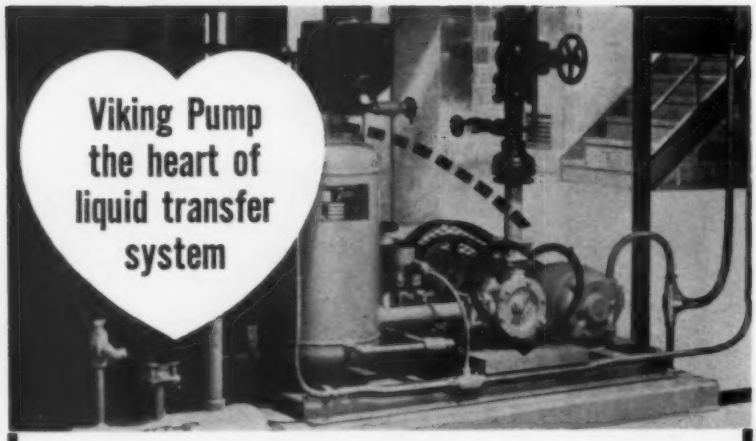
Van-Packer Hi-Temp Stack handles incinerators with flue gas temperatures up to 2000° F. without corroding.

Van-Packer PREFABRICATED REFRACTORY **Stack**

Van-Packer Company • Division of the Flintkote Company
1232 McKinley Ave., Chicago Heights, Ill. • Phone: SKyline 4-4772

Sweet's

For more facts circle 639 on Reply Card



"Slugging," the bugaboo of refrigeration systems, was solved by The Vilter Manufacturing Company of Milwaukee, Wis., by a patented liquid transfer system for dairy and ice cream plant installation as well as for many other industries. A heavy duty, mechanically sealed Viking pump built to Vilter specifications was made the heart of the liquid transfer system. With electronic controls and solenoid valves, the pump removes liquid before it reaches the compressor.

A Viking standard or specially built pump may help solve your liquid handling problems.

Write us and ask for Bulletin CZ.

VIKING PUMP COMPANY

Cedar Falls, Iowa, U. S. A. In Canada, it's "ROTO-KING" Pumps

See Our Catalog in Sweet's Plant Engineer's File

For more facts circle 640 on Reply Card

with INSUL-8-BAR® SYSTEMS

Mobile Safety Electrification for Cranes, Monorails, All Moving Machinery.

These are the only enclosed conductor systems that meet all requirements of mobile safety electrification. Standard catalog parts eliminate the need for special engineering. Installation is fast, maintenance easy. Investigate today!

CLIP COUPON FOR CATALOG

INSUL-8-CORP.
Dept. E, 1369 Industrial Rd., San Carlos, Calif.

Rush catalog re Insul-8-Bar mobile electrification.

NAME_____

COMPANY_____

ADDRESS_____

For more facts circle 641 on Reply Card

ARMSTRONG WRENCHES

An ARMSTRONG Wrench feels right—is balanced. It goes over nuts or screw heads easily, grips firmly without sloppiness, won't round corners—because openings are carefully machined to correct sizes. It's safe, strong beyond need without clumsy bulk—because of superior design and selected steels, heat treated to proper degree of hardness and tensile strength. It's quality finished, ARMALOY (alloy steel) Wrenches in chrome plate with heads buffed; HI-TEN (carbon steel) Wrenches in baked-on gray enamel with heads ground bright . . . all plainly marked for size. All are uniformly excellent tools manufactured under strict quality control, by modern methods, with modern equipment in a modern tool plant . . . 1537 different industrial sizes and types—single wrenches, or sets in metal cases, boxes or rolls . . . each a quality tool. Armstrong Wrenches are "Fine tools that encourage good work."

If you don't know your local ARMSTRONG Distributor, we will send you the names of those in your area.

ARMSTRONG BROS. TOOL CO.
5207 W. ARMSTRONG AVE.
CHICAGO 46, U.S.A.

For more facts circle 642 on Reply Card

DATA FILE

(Begins on page 216)

which keeps grease in, dirt out, and illustrates features of idlers through cutaway. Also shows typical installations. The Jeffrey Mfg. Co.

384 Belt Fasteners — Bulletin F-113 details advantages of easy-to-handle economy bulk package containing 25 complete sets of belt fasteners, including bottom plates, tops plates, clips, nuts and bolts. Flexible Steel Lacing Co.

385 Self-Dumping Hopper—Described in Bulletin 260 is a self-dumping hopper for low-cost handling of wet or dry, hot or cold, bulk materials. A variety of standard models are pictured and described and construction data furnished. Roura Iron Works, Inc.

386 Casters and Wheels—Twenty-pp Condensed Catalog 157-G covers many styles of casters, wheels and glides. Listings cover products for industrial, institutional, office and other applications. Installation guides, selection tables, descriptions and specifications for a full range of casters and wheels are included. The Faultless Caster Corp.

LUBRICATION

387 For Better Lubrication—Advantages of company's lubricants which are specially compounded for lubrication of reduction gear drives are outlined in pocket-sized folder. Features which assure smooth, trouble-free gear drive performance and lower maintenance costs are listed. Gulf Oil Corp.

388 Plug Valve Lubricants—Reference Book 39—Section 5A, 16 pp, describes company's plug valve lubricants and lubrication accessories. Standard lubricant table gives detailed description and extreme temperature range of each lubricant. Suggested lubricants listed. Homestead Valve Mfg. Co.

389 Lubricant Data Book—Sixteen-pp Lubriplate Data Book offers practical information on lubrication of ma-

"Don't get smart alecky. Just because I made a couple of mistakes . . . "

PROTECTOMOTOR

STAYNEW FILTERS

DOLLINGER

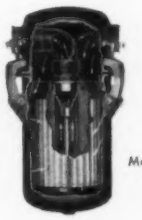
ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED

Dollinger makes ALL TYPES of filters as shown on this page, plus special filters for unusual filtration problems. New users of one specific type of Staynew filters often find a second Dollinger filter performs a great, added service in other processes or operations. Dollinger maintains complete engineering, design and laboratory facilities for the development of special filters for new and unusual applications.

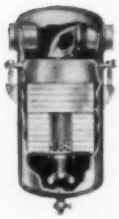
Write for complete information on any of the Staynew filters illustrated. Be sure to specify Bulletin Number or Numbers. Consult Dollinger Engineers on any special filtration problems—no obligation. Dollinger Corporation, 55 Centre Park, Rochester 3, N.Y.

PIPE LINE FILTERS

Model CPH
Pipe Line Filter
Bulletin 200



Model CVH (Vacuum)
Pipe Line Filter
Bulletin 200



Model AAPHS
(Absorption)
Pipe Line Filter
Bulletin 200

Model HPH and AHPH
(High Pressure)
Pipe Line Filter
Bulletin 200

LIQUID FILTERS

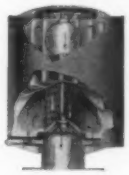
Model HE (Sump)
Liquid Filter
Bulletin 330

Model ELS (Pressure)
Liquid Filter
Bulletin 300

AIR INTAKE FILTERS

Model IDR
(Ground Level)
Air Intake Filter
Bulletin 100

Model DS (Silencer)
Air Intake Filter
Bulletin 100



Model D (Outdoor)
Air Intake Filter
Bulletin 100

Model C (Indoor)
Air Intake Filter
Bulletin 100

VENTILATION FILTERS

Electro-Staynew
Mist Collector
Bulletin 420

Electro-Staynew
Precipitator
Bulletin 400

Automatic
Ventilation Filter
Bulletin 500

Dry and
Viscous Panel
Ventilation Filters
Bulletin 600 and 700

For more facts circle 643 on Reply Card

DATA FILE

(Begins on page 216)

chinery. Gives product data on grease type and fluid products, hydraulic oil, compressor oil, motor oil. Suggestions on applying lubricants under various conditions given. Lubriplate Div., Fiske Bros. Refining Co.

MAINTENANCE

390 Basic-Roofing Information—"What You Should Know About Your Roof" is a 40-pp clearly illustrated booklet which tells what makes a roof fail, how to recognize signs of roof deterioration, what to do to keep a roof in good condition. Discusses recommended roofing practices, essentials of good re-roofing job. Johns-Manville.

391 Tough Floor Topping — Chemi-Top a corrosion resistant floor topping for food processing, chemical and other plants having severe floor corrosion problems, is discussed in 8-pp Form A515R. What Chemi-Top is, and what it can do, are explained. Two basic formulations and three service types are covered, also a non-skid type of floor topping. The Garland Co.

392 Industrial Vacuum Cleaning — Twelve-pp Bulletin 155 B describes both stationary vacuum cleaning equipment and portable industrial vacuum cleaners, the latter in both light and heavy-duty types. Recent improvements in collection and dumping methods are covered, and photos show application to conveying, reclaiming, bench work. Spencer Turbine Co.

393 Vacuum Units—This bulletin describes heavy-duty, portable vacuum units designed for a variety of plant housekeeping jobs. Application in removing litter, conveying or reclaiming materials, and collecting hazardous matter is covered. Invincible Vacuum Cleaner Mfg. Co.

394 Floor Stain Removal—This 8-pp booklet provides easy directions on floor stain removal, telling what to do, what to avoid, materials needed and how to get them. Gives general hints as well as specific instructions covering soft floors such as asphalt tile, mastic, rubber, wood, cork, linoleum, and various types of hard surfaces such as concrete, marble, terrazzo and ceramic tile. Huntington Laboratories, Inc.

395 For Overhead Maintenance — Bulletin G205RR, 8 pp, tells how to control costs when maintenance goes above arm's reach — for painting and cleaning, electrical work, etc. Pictures a variety of scaffolding arrangements. Provides brief product information on steel and aluminum scaffolding, ladders and extension trestles. The Patent Scaffolding Co., Inc.

DUST, FUME CONTROL

397 For Dust Collection—A collection of product sheets providing application suggestions and specifications on Dustkop equipment designed to solve a wide range of dust handling problems is provided in the Series 700 bulletins. Various models are described and illustrated. Aget Mfg. Co.

398 Hydro-Filter — Bulletin 556 describes outstanding features of company's hydro-filter for industrial dust collection. Cutaway view shows construction and design details. Dimensions and a table of capacities included. National Dust Collector Corp.

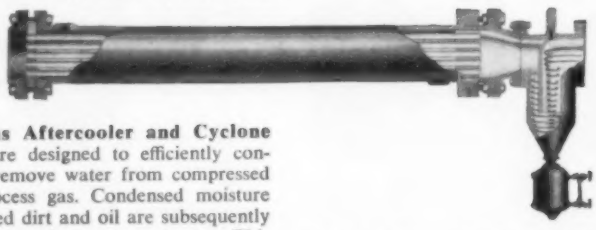
399 Industrial Dust Control—Bulletin 104, 36 pp, on company's dust filters, gives detailed information about dust control systems and how to engineer them. Includes description of the Roll-Clean Dynaclone dust filter, as well as information, capacities and dimensions for other Dynaclone and automatic continuous dust filters, intermittent filters, economy filters, etc. The W. W. Sly Mfg. Co.

400 Industrial Dust Control—A wide variety of collection methods for industrial dust control is described in 16-pp Bulletin 922. A typical case history is included as well as photos, cutaway views, drawings and capacity data on the various units. Pangborn Corp.

401 Dust Filter—Bulletin F-75 contains 24 pp of information on design, application and benefits of company's reverse jet dust filter. Performance curves of laboratory test runs are included. Also provided are filter comparison chart, photos of typical installa-

Aftercooler and Cyclone Separator designed for cleaner, dryer compressed air

R. P. ADAMS CO., INC.
254 East Park Drive, Buffalo 17, New York



The Adams Aftercooler and Cyclone Separator are designed to efficiently condense and remove water from compressed air and process gas. Condensed moisture and entrained dirt and oil are subsequently removed in a cyclone type separator. This unit is scientifically designed for maximum removal efficiency over a wide range of flow rates.

For normal use, units are available to cool gases to within 10° F of the temperature of the cooling water. Specially designed units are available to permit a 2° F approach to cooling water temperature, for application where low moisture content is critical.

Adams Aftercoolers and Separators are available from stock to handle 20 - 40,000 cfm with 10° cooling and 25 - 19,200 cfm where it is necessary to cool within 2°F of the cooling water. Special units can be supplied to suit an unlimited range of requirements. In all cases the maximum pressure loss at rated capacities is ½ psi.

This wide range of sizes enables the economical utilization of Adams Aftercoolers and Separators in virtually all industrial application. For further information on how R. P. Adams' units will solve your compressed air problems and save you money, write today for Bulletin 711.

For more facts circle 644 on Reply Card

PIPE—All Your Needs

For the fastest service on *ANY* pipe order—especially for the unusual or hard-to-get sizes . . make just one call to your nearest Foster office. Tested and structural stocks, ⅛" to 48", all walls and all specs for every purpose. Also valves and fittings from warehouse stocks. Send for free catalogs and ordering guides.

Complete Contractor Service—Since 1901

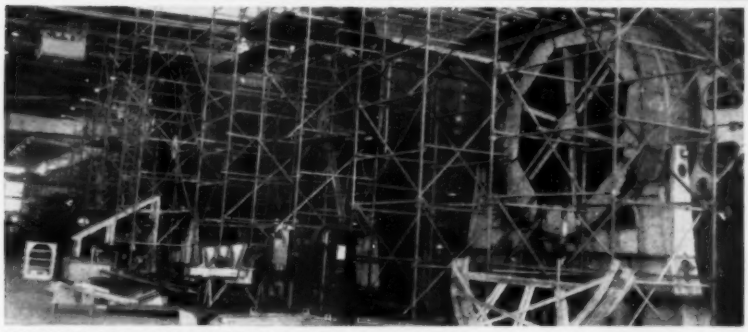
L. B. FOSTER CO.

PITTSBURGH 30 • ATLANTA 8 • NEW YORK 7
CHICAGO 4 • HOUSTON 2 • LOS ANGELES 5

For more facts circle 645 on Reply Card

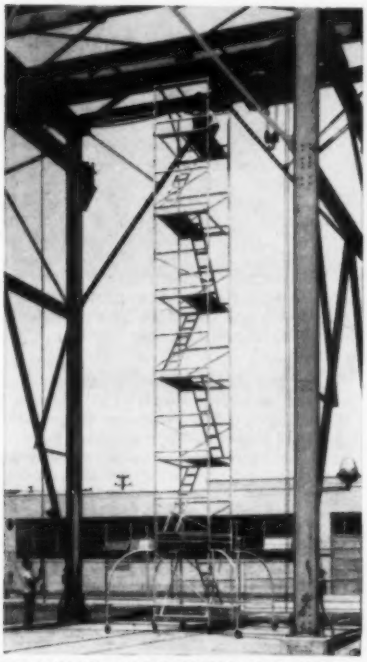
Safe Maintenance Methods

A picture report on efficient ways to scaffold . . . by The Patent Scaffolding Co., Inc.



INDUSTRIAL SCAFFOLDING—During construction of hull sections for new atom subs at the Mare Island Naval Shipyard, "TubeLox"® Scaffolding helps workmen get safely around the curved shapes. Made with only four basic parts, this scaffolding is erected rapidly to conform to almost any shape, size or contour and on any terrain, if exterior work is considered. Adjustable couplers and a variety of tube lengths permit unlimited scaffold placement.

PAINTER'S HELPER—"Trouble Saver"® Sectional Rolling Scaffold with 12"-wide Featherweight Stages gives Gombert Bros., an easily moved, safe painting scaffold at the North Belmore (N.Y.) Elementary School.



ROLLING ALUMINUM TOWER—To repair a crane at the Public Service Electric & Gas Co., Bergen County Switching Station, N. J., a Model B Aluminum Sectional Rolling Scaffold is used. Four outrigger supports increase base area to 10'x10' for greater stability at extreme heights. Five 6'-high sections atop the 6'9½"-high base bring workmen safely up 36'-9½" under the crane mechanism.

REFINERY WORK—At the Tidewater Oil Co., Wilmington, Del., 3500 "Trouble Saver" Scaffolding frames and 15 miles of "TubeLox" Scaffolding are used by C. F. Braun & Co., contractor, to get strong, level, safety-assured working platforms on refinery's varied structures.

LIGHT-DUTY SCAFFOLDS—Designed for light-duty work, "Gold Medal" Junior Safety Swinging Scaffolds provide extra-safe, quick working levels on tanks, buildings and other structures. Suspended from above by 5/16" galvanized steel cable, these scaffolds have 28"-wide plattorms with double, steel-reinforced side-rails; hinged toe-boards; and 16', 18', 20', 22', 24'-lengths.

"GOLD MEDAL"®— Safety Platform Step Ladders. Broad working platforms. Top quality construction. U.L. approved. Sizes: (total height) 5' to 20'.

NEW STEP LADDER—Aluminum Safety Platform Step Ladder with nonslip safety platform and steps. Strong, lightweight. Heights 5' to 14'. Other aluminum models include: Extension Ladders, 16' to 40'; Heavy Duty Step Ladders, 4' to 14'; Platform Step Ladders, 5' to 14'; and Single Ladders, 8' to 20'.

Write for free copy of "Controlling Costs", Bulletin G205R. Also, see the Yellow pages of your 'phone directory for the nearest Patent Scaffolding Co. office or representative that *sells* or *rents* "Gold Medal" Scaffolds.

FOR GREATER SAFETY...EFFICIENCY...ECONOMY

THE PATENT SCAFFOLDING CO., Inc.

38-21 12th Street Dept. P.E. Long Island City 1, N. Y.

For more facts circle 646 on Reply Card

The *Work-Horse* of Mechanical Seals

For the long haul on heavy-duty sealing jobs —specify the engineered mechanical seal with the greatest record of service on processing equipment . . .

FOR FURTHER INFORMATION WRITE FOR CATALOG NO. 480-DS-DN

The PERFECT SEAL

DURAMETALLIC CORPORATION
KALAMAZOO MICHIGAN

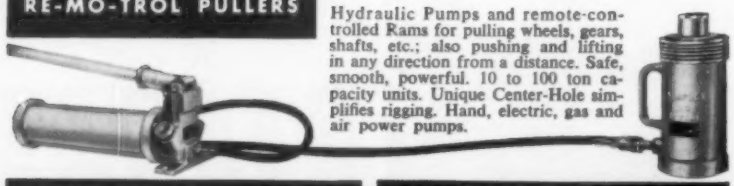
For more facts circle 647 on Reply Card

Push, Pull or Lift Safely with SIMPLEX

HYDRAULIC EQUIPMENT

RE-MO-TROL PULLERS

Hydraulic Pumps and remote-controlled Rams for pulling wheels, gears, shafts, etc.; also pushing and lifting in any direction from a distance. Safe, smooth, powerful. 10 to 100 ton capacity units. Unique Center-Hole simplifies rigging. Hand, electric, gas and air power pumps.



JENNY "CENTER-HOLE" PULLERS

Self-contained Hydraulic Pullers with famous Center-Hole for easy pulling, pushing, lifting. Rugged, versatile; 6 models, 30 to 100 ton capacities.

STANDARD HYDRAULIC JACKS

Sturdy, safe, efficient units to do any lifting job easy and fast. 8 models; 3 to 100 ton capacities.

Get full information on the most complete industrial line of Hydraulic Jacking and Pulling equipment; write for Hydraulic Bulletin.

WORLD'S LARGEST MFGRS. OF INDUSTRIAL MECHANICAL AND HYDRAULIC JACKS
SIMPLEX JACKS

TEMPLETON, KENLY & CO.
2561 Gardner Road, Broadview, Ill.

For more facts circle 648 on Reply Card

DATA FILE

(Begins on page 216)

tions, typical layouts, capacity ratings, dust filter dimensions, conversion tables. The Day Co.

402 Air Pollution Control—Described in this 8-pp bulletin is air pollution control and ventilation equipment. Covers multi-wash collectors, entrainment separators, recirculating and settling tanks, dust, fumes and smoke hoods and other equipment. Claude B. Schneible Co.

403 Fly Ash Collector — This 6-pp bulletin describes the "LR," a fly ash collector for efficient fly ash prevention on small boiler installations of limited draft. Collection efficiencies are shown on graph. Buell Engineering Co., Inc.

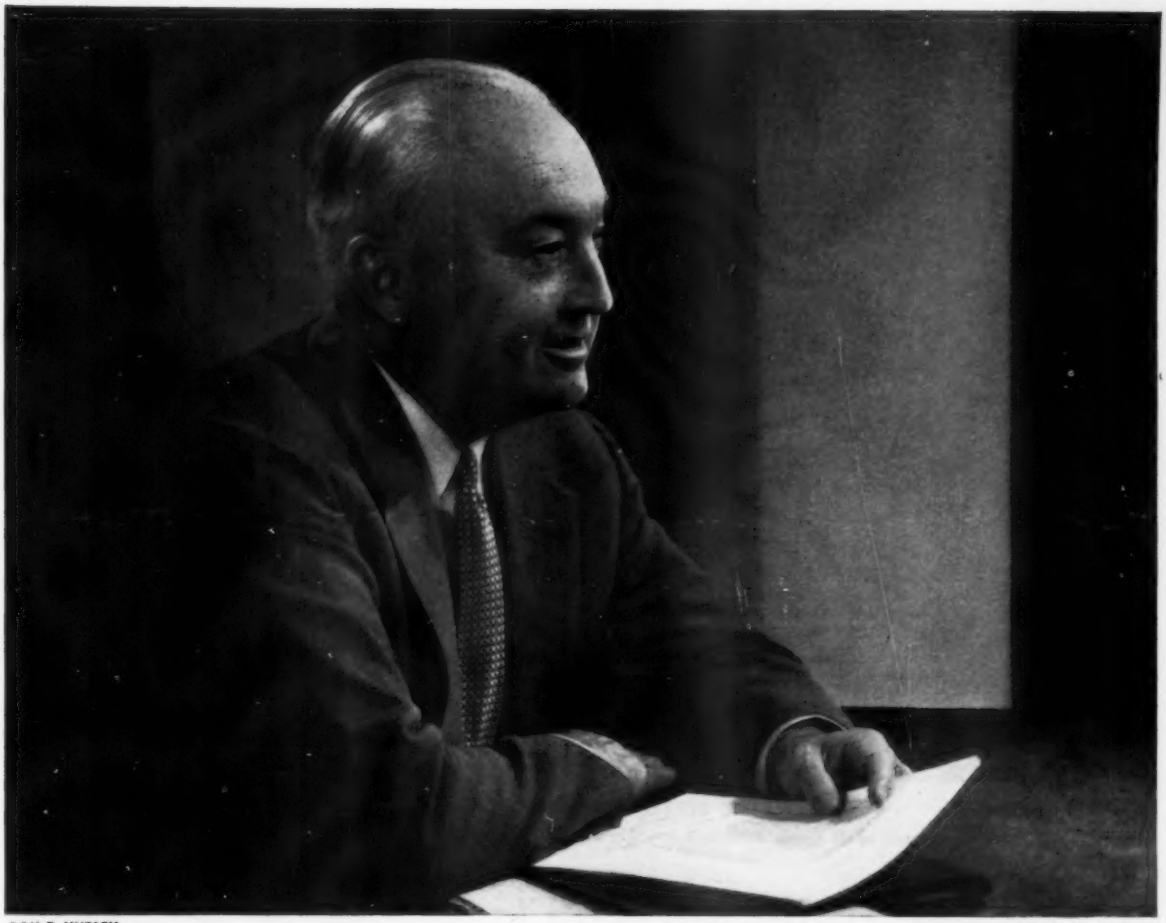
SAFETY, SANITATION

404 Protective Clothing — Catalog 12000, 12 pp, describes and illustrates company's line of industrial clothing for protection against water, fire, acids and alkalis, slipping and scuffing. Various types of work gloves and suits and coats featured. The B. F. Goodrich Co.

405 Special Fire Protection—Devoted to special hazard fire protection, this 44-pp booklet covers both equipment and methods. Tells how to recognize special fire-hazardous conditions in a plant. Discusses in detail major types of fire protection, telling how each functions, giving its advantages and limitations, and illustrating some examples of successful use. Two features of interest are a discussion of fire itself and a definition of fire-protection terminology and an at-a-glance selector chart. Grinnell Co., Inc.

406 Preventing Skin Diseases—Prevention of occupational skin diseases is the subject of this 44-pp informative booklet. Among the categories covered are: incidence of occupational diseases, anatomy and physiology of skin and its appendages, causes and prevention of

"By George, you're right, Johnson, that is an 'E'!"



ROY T. HURLEY

Portrait by Bachrach

"More than 11,000 of our 19,000 employees are now buying U.S. Savings Bonds Regularly"

"We are delighted to see the steady increase in the number of our people who are buying U.S. Savings Bonds through the payroll plan. More than 59% of our employees are now enrolled.

"To enjoy the benefits of peace and freedom, we must provide for our own personal financial security and, at the same time, create the power for peace through support of an adequate defense program. Systematic savings through the Savings Bond program will keep us ahead of any potential aggressor and help insure the soundness of an economic system which encourages and permits each of us to look forward to a bright, secure future."

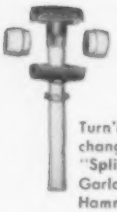
ROY T. HURLEY, ***Chairman and President, Curtiss-Wright Corporation***

Today there are more Payroll savers than ever before in peacetime. If employee participation in *your* Payroll Savings Plan is less than 50% . . . or if *your* employees now do not have the opportunity to build for their future through the systematic purchase of U.S. Savings Bonds, give your State Director an opportunity to help. Look him up in your phone book. Or write: Savings Bonds Division, U.S. Treasury Dept., Washington, D.C.

PLANT ENGINEERING

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE

NEW NYLON HAMMERS BY



Turn'n change, "Split-Head" Garland Hammer.

Easy face rotation for even wear, long life.

Exclusive Garland nylon safe-contour mold fits flush with hammer head to keep head from "biting" when blow slips or is angled. Moisture, heat, oils and most acids do not affect Garland Nylon faces.

Garland Nylon Faces Are Interchangeable With Rawhide . . . Are Available With or Without Split Head Hammer. Sizes 1 through 5.

Write for specification data and prices.

Garland Manufacturing Co.

68 WATER STREET • SACO, MAINE

For more facts circle 650 on Reply Card

Hobbs HOUR METERS for

MEASUREMENT OF USE

PROTECTIVE MAINTENANCE

Operating Time of Production and Service Equipment — AT A GLANCE!

To obtain maximum use of production and service equipment, it is essential to know the hours of operation. This information permits accurate study of utilization; also provides data needed for protective maintenance which improves performance and lengthens service through regular attention at the right time.

Hobbs Hour Meters indicate to the HOUR and MINUTE the time of equipment operation. Not a revolution counter, but a true timing instrument. ALTERNATING CURRENT meters time the operation of any equipment powered by a-c electricity; DIRECT CURRENT meters, the operation of any equipment powered by internal combustion engine or battery.

● **Distributors in Principal Cities**

WRITE FOR CATALOG 600

JOHN W. Hobbs CORPORATION — A DIVISION OF STEWART SW WARNER

2054 YALE BLVD. SPRINGFIELD, ILLINOIS

For more facts circle 651 on Reply Card

DATA FILE

(Begins on page 216)

occupational dermatoses. Huntington Laboratories, Inc.

HEATERS, HEATING

407 Unit Heaters — Catalog 157, 32 pp, contains performance and application data on company's line of unit heaters, including design and construction details, dimension diagrams, and tabulated information on steam capacities, conversion factors, hot water capacities, performance factors, and heat transfer coefficients. Modine Mfg. Co.

408 Industrial Heaters — Advantages and features of a line of industrial heaters for space heating, drying, make-up air and oven applications are detailed in this illustrated bulletin. A cutaway view points out essential design features, and tables of dimensional data and engineering data are included. Lennox Industries, Inc.

409 Electric Heating—Bulletin 975A, 12 pp, outlines advantages of electric heating and describes a number of different methods, such as radiant, convection, radiant and convection and forced hot air. Commercial and industrial applications are pictured, and specification and dimensional data included. Edwin L. Wiegand Co.

410 Heat Transfer Equipment—Cast iron steam heat transfer equipment, including unit heaters, blast heaters, and radiators, is featured in 40-pp Catalog 956. Construction details are illustrated and described, and graphs, dimensional data, heating capacity tables, conversion factors, piping diagrams, installation data and specifications included. D. J. Murray Mfg. Co.

On pages 211-212 are two postage-free Reader Service Cards provided for your convenience in ordering these bulletins. You may also use the cards to order any literature mentioned in ads.

411 Fan Heater—Bulletin 109 describes company's high pressure steam fan heater designed to utilize both sensible and latent heat of high pressure steam. A color-keyed diagram illustrates operation. Niagara Blower Co.

412 Plumbing, Heating Supplies — Edition H is the current edition of this company's 126-pp general catalog on plumbing and heating repair parts, tools and accessories. Indexed and illustrated, the catalog gives detailed information on sizes, intended uses. J. A. Sexauer Mfg. Co., Inc.

413 Stainless Steel Heaters — Complete description and specifications on stainless steel direct-fired heaters are included in 6-pp Bulletin F-57A-RO. Cutaway views, drawings and diagrams

DATA FILE

(Begins on page 216)

illustrating design and construction features are included. Reznor Mfg. Co.

414 For Heating Systems — A great deal of helpful information on heating systems is presented in Engineering Data Manual 2695, 28 pp. Detailed illustrated information pertaining to heating problems is given. Besides covering heating terminology, there are sections on steam data, water properties, piping data, weights and measures and pipe dimensions. Dunham-Bush, Inc.

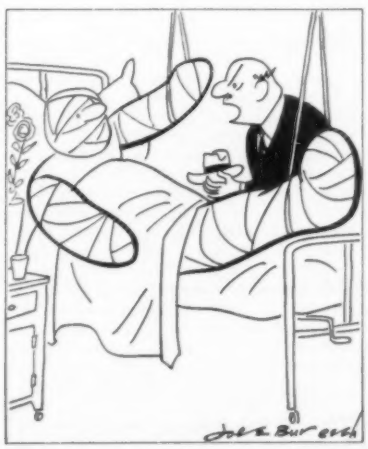
INSULATION

415 Glass Fiber Insulation — Among the company's products described in this illustrated bulletin are three kinds of flame-blown glass fiber insulations used for thermal and acoustical applications. Charts are included illustrating the acoustical and thermal values. L. O. F. Glass Fibers Co.

416 Insulation Specifications—This set of six specifications covers applications of Foamglas insulation for industrial equipment and piping. Each booklet contains tables of suggested thicknesses of insulation to be applied, drawings of installation procedure, supports, and recommended finishes. Booklets are devoted to low-, medium-, high-, and dual-temperature equipment and piping, to underground piping, and spheres. Pittsburgh Corning Corp.

417 Piping Insulation — Seven-pp Bulletin SO 1054 features a snap-on, one-piece molded pipe insulation of fine glass fibers for hot or cold piping. Specifications are given for industrial, commercial, and institutional piping. Gustin-Bacon Mfg. Co.

418 For Insulation Protection—Provided in this comprehensive looseleaf manual is technical information covering practically every requirement for insulation protection. An aid to proper adaptation and application of mastics, flashing compounds, adhesives and sur-



"I hope you realize, Potts, what you've done to our safety record!"

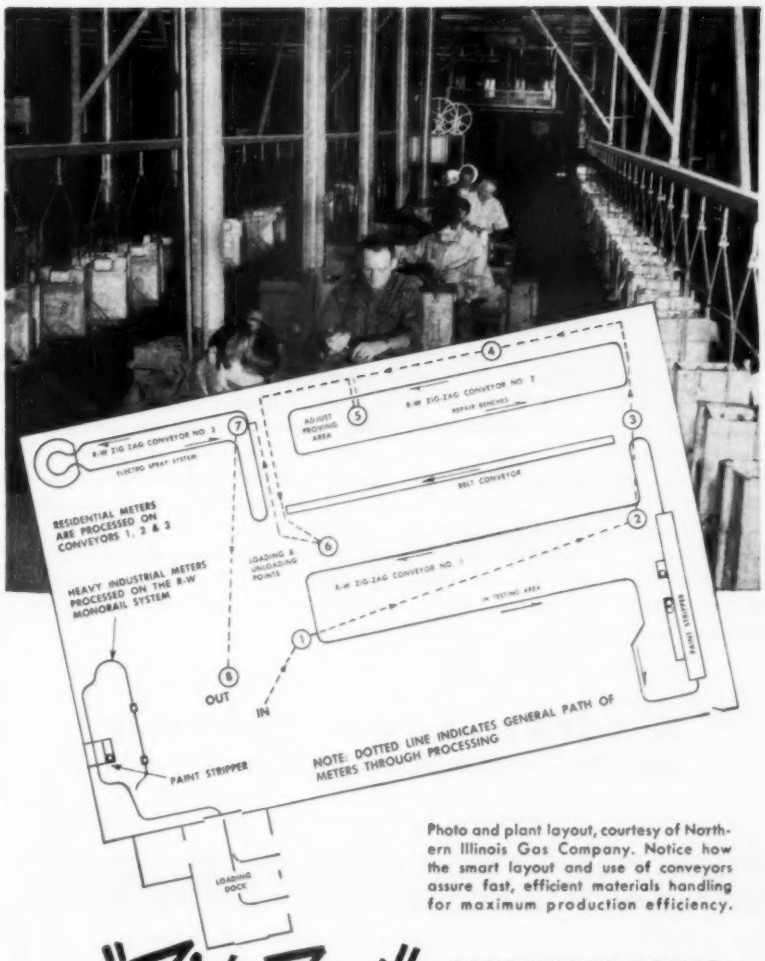

R-W ZIG-ZAG CONVEYOR NO. 3
ELECTRO SPRAY SYSTEM
RESIDENTIAL METERS ARE PROCESSED ON CONVEYORS 1, 2 & 3
HEAVY INDUSTRIAL METERS PROCESSED ON THE R-W MONORAIL SYSTEM
ADJUST PROVING AREA
R-W ZIG-ZAG CONVEYOR NO. 2
REPAIR BENCHES
BELT CONVEYOR
LOADING & UNLOADING POINTS
R-W ZIG-ZAG CONVEYOR NO. 1
IN TESTING AREA
BRASSES THERE
OUT
IN
PAINT STRIPPER
NOTE: DOTTED LINE INDICATES GENERAL PATH OF METERS THROUGH PROCESSING
LOADING DOCK

Photo and plant layout, courtesy of Northern Illinois Gas Company. Notice how the smart layout and use of conveyors assure fast, efficient materials handling for maximum production efficiency.

"Zig-Zag"® CONTINUOUS POWER R-W CONVEYORS

provide fast, efficient meter handling at the Northern Illinois Gas Company

The photograph, above, shows one of the R-W "Zig-Zag" Conveyors installed in the Northern Illinois Gas Company's new meter shop in LaGrange, Illinois. This plant, with its new innovations in both methods and equipment, has been described as being "as modern as tomorrow". Notice how the R-W "Zig-Zag" Conveyors carry the residential gas meters through the entire process ... from the paint stripper, to the work stations and finally the electro paint sprayer. Large industrial meters are carried through a similar process on an R-W Monorail Conveyor System.

R-W "Zig-Zag" Conveyors utilize valuable overhead space to provide a continuous flow of materials for maximum production. They are extremely flexible ... easily move up, down, in, out and around ... will carry unit loads up to 125 lbs. at speeds from one inch to 100 feet per minute. R-W "Zig-Zag" Conveyor Systems are economical to purchase, install and operate ... may be quickly and easily altered, expanded or relocated by plant personnel. There's an R-W "Zig-Zag" Conveyor to meet your exact requirements.

WRITE TODAY

for complete information ... request Catalog No. A-93R.

Richards-Wilcox
MANUFACTURING COMPANY
MATERIAL HANDLING DIVISION

460 W. THIRD STREET, AURORA, ILLINOIS • Branches in Principal Cities
For more facts circle 652 on Reply Card

This Self-Contained Fluid Cooling System

...gives most accurate temperature control

Applied in cooling industrial machines or processes to temperatures approaching the ambient wet-bulb, the NIAGARA *Aero* HEAT EXCHANGER is independent of any more than a nominal water supply or disposal. The coolant system is a closed one, free from dirt and maintenance troubles.

Heat is removed from your process *at the rate of input*, giving you precisely the temperature you require and assuring the quality of your product. Heat may be added to prevent freezing in winter or for better control in a warm-up period. Liquids or gases are cooled with equal effectiveness.

Heat is rejected outdoors. Only the little water evaporated on the cooling coils in the air stream, or discharged to prevent hardness build-up, is consumed.

Niagara sectional construction saves you much installation and upkeep expense, gives full access to all interior parts and piping. Your equipment always gives you full capacity and "new plant" efficiency.

Write for Niagara Bulletin No. 132 for complete information

NIAGARA BLOWER COMPANY

Dept. PE-10, 405 Lexington Ave., New York 17, N.Y.

District Engineers in Principal Cities of U. S. and Canada

For more facts circle 653 on Reply Card

WEMCO® the INCREDIBLE Torque-Flow Pump

pumps almost everything

(what will go in will come out)

secret: recessed impeller; continuous open passage

(maintenance a thing of the past)

Western Machinery Company 650 Fifth St. • San Francisco, Calif.

For more facts circle 654 on Reply Card

DATA FILE

(Begins on page 216)

face coatings, this book presents information classified as to industry usage, as power, process, cold storage. Book is available to qualified plant engineers. Benjamin Foster Co.

419 Insulation Coating — This 32-pp illustrated handbook, Form L-17, presents the advantages of company's No-Drip insulation coating for preventing condensation drip from metal, concrete, brick, wood, plaster or composition surfaces. Lists applications and describes methods of use. J. W. Mortell Co.

FANS, VENTILATING AND AIR CONDITIONING

420 Ventilation Units—Bulletin FM-315, 25 pp, describes basic construction of company's package propeller fans for commercial and industrial applications. Illustrated case histories of typical installations included. Buffalo Forge Co.

421 Air Engineering—Bulletin E-57 is a 24-pp air engineering data file covering engineering and test facilities for propeller fans, specifications, construction, maintenance, and installation. Tables for estimating air-handling requirements, entrance and elbow losses are provided. Aerovent Fan Co., Inc.

Postage-free Reader Service Cards make it easy to order catalogs. Cards are provided on pages 211 and 212.

422 Industrial Fans—Bulletin 690-A, 12 pp, contains dimensions and application and performance data on direct connected fans for general and system ventilation and power roof ventilators, with air deliveries to 103,200 cfm. Design features and component parts are detailed and typical installations illustrated. Propellair Div., Robbins & Myers, Inc.

423 Fans and Blowers — Bulletin A-108, 16 pp, contains installation, operation and maintenance information on fans and blowers for many applications. Typical centrifugal blower performance is plotted on curve, and other engineering data such as designation of rotation and discharge, motor data, terms and definitions, rectangular equivalents of round ducts, entrance losses. Castle Hills Corp. Hartzell Propeller Fan Co.

424 Pressure Fans—Catalog 857 fully covers a new line of fan equipment for volumes from 300 to 12,000 cfm and pressures from 10- to 50-in. sp. Dimensions and capacity tables included along with selector charts. Clarage Fan Co.

425 Air Conditioning Units—Bulletin 786 contains 54 pp of selection data on air conditioners, including capacities, standard arrangements, dimensions, etc.

DATA FILE

(Begins on page 216)

Steps in selection of basic unit and components are outlined. First pages are devoted to choosing the physical size based on air capacity and face velocity requirements, while succeeding pages concern themselves with heating and cooling requirements, temperature control. American Air Filter Co., Inc.

WATER TREATMENT

426 Products and Services—Bulletin GSP-901 24 pp, describes products and services of this company and its various divisions. These include ring balance instruments, components for control systems, electronic devices, force measuring devices, water and steam treatment, testing equipment. Hagan Chemicals & Controls, Inc.

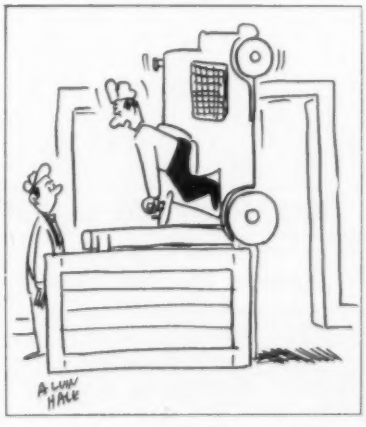
427 Cooling System Treatment—Bulletin C1 describes advantages of company's treatment for cooling tower systems with synergised polyphosphates. Details of the cooling system treatment are given. National Aluminate Corp.

428 De-Ionization Processes — Various types of de-ionization processes and equipment are featured in Bulletin B-157. Covers mixed bed de-ionization, twin-bed de-ionization, industrial softeners, filters of various types, aerators for gas removal, clarifiers for flocculation, standard package units, power package for boilers and process water. Illinois Water Treatment Co.

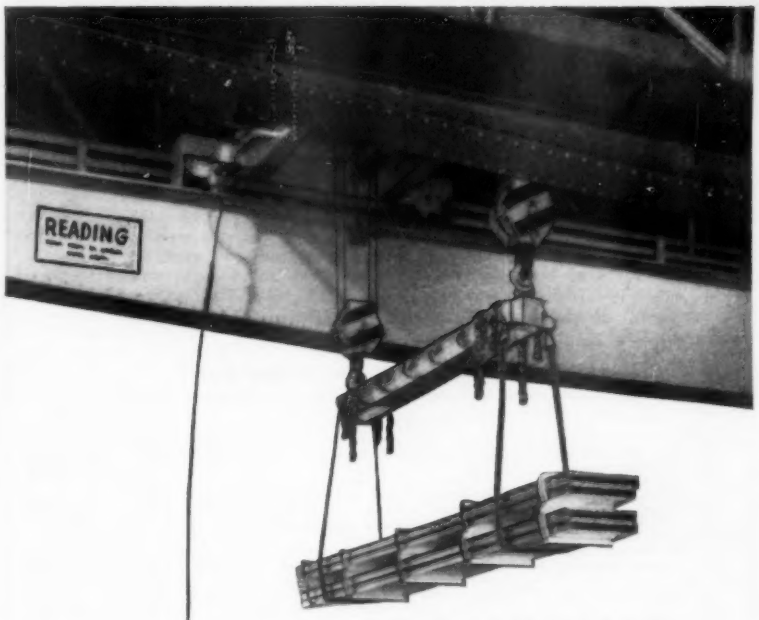
TOOLS, MACHINE SHOP

429 Portable Tools—Industrial construction and other portable power tools for the manufacturing, construction, woodworking and metal-working industries are described in this 50-pp catalog. Tools appear in logical sequence of size and duty rating. Specification tables at bottom of each page permit easy selection. Skil Corp.

430 Industrial Tools—Information on a complete line of industrial tools, including 500 new types and sizes never before offered, is presented in 120-pp Catalog 57. Included are com-



"It's the brakes again . . . "



At ALCOA,
2 Reading Cranes
do the **heavy** work . . .

Two 10-ton Cranes by Reading are now in operation at ALCOA's Lafayette, Indiana plant. One is used for heavy handling in the area around the 14,000-ton extrusion press, while the other has made an important contribution to easier, more economical warehousing.

The warehouse area crane, pictured above, operates from the floor by a pendant push-button station. Both crane slings and steel-handling racks are used. It's a spread bridge model and runs on a 220′ track.

Since its installation, warehousemen are able to stack higher, handle longer and heavier aluminum shapes, tubing and ingots. More space is made available for storage and both time and labor are saved.

Reading's unique "Unit Construction" plan offers you special equipment for your own plant at the low cost of standard parts. Investigate now this proven way to get faster, better materials handling. A note on your company letterhead will bring a Reading engineer to analyze your handling operations . . . at no obligation.

READING CRANE & HOIST CORPORATION, 2103 Adams St., Reading, Pa.

READING CRANES

CHAIN HOISTS · OVERHEAD TRAVELING CRANES · ELECTRIC HOISTS

For more facts circle 655 on Reply Card

MEMO:

to our readers . . . .

AVAILABLE HELP FOR PLANT PROBLEMS

Many outstanding articles published in Plant Engineering and Power Engineering have been reprinted to assist you on your everyday job problems. Following is a list of the available reprints with prices. Look this list over, decide which ones you want, fill in the coupon at the bottom of the page and send it to us with your check or money order.

Some of these reprints are in comparatively short supply so get your order in early.

Which one (ones) will serve you best?

ORDER NO.	INFORMATION	UNIT PRICE
1	The Coal Storage Manual—24-page reprint; on quantity orders, special price will be quoted.	$1.00
2	Industrial Lighting—12-page manual covers lighting factors a plant engineer should consider. Discusses selection of voltages, relative costs, economic analyses and group replacement time studies.	0.50
3	So You're Going To Overhaul Your Turbine Generator—48-page reprint of series of articles on details of U. S. Steel Co. 25,000-kw turbine overhaul.	1.00
4	Industrial Ventilation—8-page manual presents new, thought-provoking ideas on industrial ventilation. Such points as measuring and controlling radiant heat and how to find the comfort range are discussed.	0.25
5	Effective Start-Up Engineer Smooths Out Preliminary Power Plant Operation—16-page reprint covers effective scheduling of start-up, checking of condensate, boiler feed and circulating water systems and steam lines before start-up, and running in of auxiliaries. By J. H. Hunnicutt	1.00
6	Fluid Power Maintenance—48-page reprint of series of 12 articles on hydraulic and pneumatic industrial applications.	1.00
7	Your New Industrial Power Plant—How To Get It Into Operation—24-page reprint of series of articles by Paul N. Garay from 1957 issues on building your new plant right, how to set up operating records and train operators, tools and stores, procedure in getting ready to operate.	1.00
8	Industrial Maintenance—36-page reprint of 11 articles appearing in past issues of Plant Engineering.	1.00
9	What It Costs to Modernize Small Industrial Power Plants—24-page reprint of series of articles by H. D. Fisher from 1957 issues, giving six case studies of plants from 25,000 to 50,000 lb. of steam per hour capacity.	1.00
10	Cherry Hill—16-page reprint of article describing what construction preplanning is necessary. Article discusses use of consultants, methods of bidding, basic concepts, selling the project to management, details of project and cost-saving ideas.	0.50
11	A Power Plant Primer—32-page reprint of article by A. W. Kramer explaining the fundamental principles of the steam-electric power plant and of each unit of principal equipment, showing how they all operate together to generate electricity.	1.00
12	Pumps—4-page reprint of article "Pumps—and Why They Have Troubles." Some of the points covered in article: sagging foundation, distortion of base plate, proper packing and its importance.	0.10
13	Dust Collecting—8-page reprint of article "Guideposts Tell How To Select Dust Collecting Equipment." Explains the many factors to consider before selecting the dust collector to serve your needs. Table included shows wide range of industrial processes and the dust collector recommended for each classification.	0.10
14	Construction Briefs—12-page booklets. Booklet No. 1—covers beam reactions, bending moment, moment of inertia and section modulus. Booklet No. 2—deflection, horizontal shear and floor loading. Booklet No. 3—columns, trusses and welded connections. Booklet No. 4—fastenings for timber, design of trussed roof and structural design.	0.50 Each Booklet

Enclose your check or money order with the coupon below. Postage on reprints will be paid by us

EDITORIAL DEPARTMENTS
TECHNICAL PUBLISHING COMPANY
308 EAST JAMES STREET BARRINGTON, ILLINOIS

NO.		NO.	
1		8	
2		9	
3		10	
4		11	
5		12	
6		13	
7		14	

DATA FILE

(Begins on page 216)

plete lines of wrenches, socket wrenches, drop forged clamps, tool holders, set up and hold down tools, cutting tools and pipe tools. Photos, drawings and numerous charts aid selection. Armstrong Bros. Tool Co.

431 Pipe Tools—Ordering and application information on Ridgid pipe tools is provided in 16-pp illustrated Catalog 7596R6. Wrenches, cutters, threaders, reamers, vises, and others are pictured and described, also power drives, pipe and bolt threading machines, oilers. The Ridge Tool Co.

432 Masonry Bits—Catalog M B C-56 describes carbide-tipped masonry bits for drilling holes in tile, brick, concrete, granite or any other kind of masonry. Specifications are included, as well as a table giving chuck and shank requirements to adapt to different electric or pneumatic hammers. New England Carbide Tool Co., Inc.

Postage-free Reader Service Cards make it easy to order bulletins. Cards are provided on pages 211-212.

433 Handy Fastening Tool—Two booklets show different ways in which this fastening tool can be used. One booklet shows how the tool can be used for plant maintenance—fastening conduits, bus ducts, junction and outlet boxes, surface raceways, fixtures and frames, duct straps, fan and blower mounts, etc. The second booklet indicates the correct fastening and charge to use to fasten materials of varying thickness to concrete or steel. Ramset Div., Olin Mathieson Chemical Corp.

434 Hydraulic Jacks, Pullers—Bulletin Hydraulic-56, 16 pp, features company's line of hydraulic jacks and pullers. Prepared as an application guide for using various high-pressure jacking and pulling tools, it contains full descriptions, mechanical specifications. Templeton, Kenly & Co.

435 Data for the Shop—"Fluids and Facts for Metal Working" is a pocket-size booklet of about 44 pp. A section

CLASSIFIED ADVERTISING

EQUIPMENT FOR SALE

Stainless Precision Tools
Stainless Steel T-Squares, Triangles, Straightedges, and Precision Drawing Instruments and Scales.
CATALOG ON REQUEST
THEO. ALTENEDER & SONS
Since 1850
1219 Spring Garden St., Philadelphia 23, Pa.

DATA FILE

(Begins on page 216)

on metal working fluids covers their function and selection, preparation and use of soluble oils and paste compounds, and prevention of dermatitis. Conversion tables, steel numbering systems, machinability ratings included. Standard Oil Co. (Ind.)

OTHER EQUIPMENT

436 Flexible Metal Hose—Contained in this 36-pp bulletin is detailed information on characteristics and applications of company's flexible metal hose designed to serve a variety of industrial needs. Includes specifications, list of applications, and photos of the various types of hose available. Typical installations pictured. Pennsylvania Flexible Metallic Tubing Co., Inc.

437 Heat Exchanger Tubing — Cited in this 30-pp catalog are typical cases where cupro-nickel or Monel tubing installed in heat exchangers resulted in substantial savings and better efficiency through longer tube life. Describes applications of this tubing. The International Nickel Co., Inc.

438 Special Blast Cleaning—Photos and schematic drawings are used in 34-pp Catalog 105-D to show how airless blast cleaning, air blast cleaning and wet blast cleaning has been employed in specific applications. Short case histories relate the experiences of more than 50 companies in solving special cleaning problems. Wheelabrator Corp.

439 Shop Equipment—Work benches, tool stands, shelving and other pressed steel equipment for the shop, laboratory and assembly line are shown in 8-pp Form 2299. Construction features and specifications of size, top material, equipment variations given. Standard Pressed Steel Co.

440 Heat Exchangers—Bulletin GC-1054, 12 pp, describes features of company's heat exchanger with pumped boiler water circulation. Materials of construction are described and material specifications and operating pressures tabulated. Cost and performance advantages offered by use as instantaneous water heater, and as radiation heater are detailed. Bell & Gossett Co.

441 Lime Slaker — Bulletin 255-A describes the complete line of new type lime slaker. This equipment slakes the lime in a form of a paste rather than a slurry. Eliminating inherent difficulties of conventional slakers, the Viscomatic slaker does not require the use of insulation, heat exchangers, high speed mixers, or hot water. Infilco Inc.

442 Cooling Towers—Featured in 20-pp Catalog DFA-58 is company's double flow Aquatower, combining high efficiency with low silhouette. Specifications and engineering data are included, as well as dimensional drawings showing construction features of the cooling towers. The Marley Co.

443 Industrial Finishing Equipment—Catalog A 657, 12 pp, describes a complete modern finishing system for cleaning, rust proofing, drying, painting and finish baking. The R. C. Mahon Co.

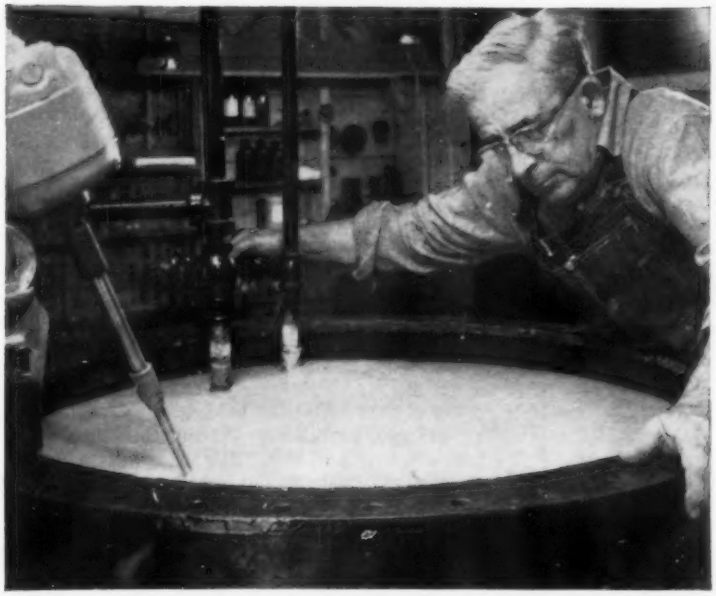
444 For Cleaner Furnace—The use and application of Oxi Crystals to keep furnaces and the fireside of boilers free of slag, encrusted carbon, soot and firescale is described in a recently published pamphlet. Oxi Corp.

445 Turbine Oil Conditioning—Bulletin 832-P, 12 pp, describes a dry type turbine oil conditioner designed to prevent action of air, heat, water, metals and foreign matter on turbine oil. Diagrams and text explain how turbine oil conditioning systems operate and tables list pertinent data. Bowser, Inc.

446 Chemical Products — This 8-pp catalog describes company's production and maintenance chemicals, including sealing compounds, cements, oils and lubricants, hydraulic fluids, service products, and others. Table lists recommended sealants for specific applications. Permatex Co., Inc.

447 Equipment Selector Charts—Bulletin CE-50, 20 pp contains selector charts on corrosion-resistant equipment for process industries. Tables cover general considerations in selection of material, physical properties, corrosion resistance, techniques and skill in manufacture of equipment. Describes rubber and plastic pipe, tubing and fittings; valves; pumps. Amerace Corp., American Hard Rubber Div.

HAGAN COAGULANT AIDS SOLVE COLOR PROBLEM FOR WOOLEN MILL



Slurry-Feeding Hagan Coagulant Aid No. 18 at J. J. O'Donnell Woolens, Inc.

J. J. O'Donnell Woolens, Inc. produce cashmere and high quality ladies woolen goods, specializing in pastel shades. Located downstream of a steel mill, a sewage plant and several other woolen mills, the periodic high organic color and detergent content of Blackstone River water created a difficult clarification problem. Even with heavily increased alum dosages, color removal was poor, frequently necessitating reprocessing.

Over two years ago, the plant adopted the use of Hagan Coagulant Aid No. 18 during periods of high color. Alum dosage has been reduced by 25%, with good floc formation and sedimentation. Color removal is now excellent.

Hagan Coagulant Aids are non-toxic, easy to handle, and produce a large tough floc that speeds settling time and reduces carryover.

Hagan Aids may be dry-fed or slurry fed as desired. Write for Bulletin 410-12-2 for information on the complete line of Hagan Coagulant Aids.

CALGON COMPANY

DIVISION OF HAGAN CHEMICALS & CONTROLS, INC.
HAGAN BUILDING, PITTSBURGH 30, PENNSYLVANIA
DIVISIONS: CALGON COMPANY, HALL LABORATORIES
IN CANADA: HAGAN CORPORATION (CANADA) LIMITED, TORONTO

For more facts circle 658 on Reply Card

. . . just published

the mammoth new reference work of plant operation and maintenance

by the editors of ***Plant Engineering***

There has never been a book like this before. Unlike any other work in the field, it is the **practical** sourcebook of plant maintenance and operation. It is **not** a theoretical text. PLANT ENGINEERING PRACTICE presents the solid, useful, hard-earned experience of over 100 experts in many fields. Some of these men are top plant engineers reporting solutions to problems in their own plants. Others are technical specialists in specific fields whose work has proved valuable to plant engineers. All are first-rate.

The book contains 226 separate studies, divided into 13 sections, as shown at the right. It is a big book—704 pages, with over 800 illustrations. In addition, it contains a complete 12-page master index, with over 3,000 page references. This will enable you to locate any desired item at once.

Please note the 13 chapter headings at the right. Chances are that these are the major areas of responsibility for you and your staff. Of course, this is no coincidence—the book was planned to cover every major area of the plant engineer's responsibility. And it was planned for lasting interest and value—to be used again and again, over the course of many years. This book was designed for you, and you owe it to yourself to examine it, at no cost and without obligation.

Fill out and return the coupon below. You will receive your personal examination copy of PLANT ENGINEERING PRACTICE for 10 days free use. If, at the end of that time, you decide the material is not useful to you, just return the book without obligation. That, we feel, is the only fair way to evaluate a book of this size and scope.

704 pages, large 8¾ x 11⅝" size

Over 600 photographs; over 200 line drawings

Contains 226 separate studies; each selected for lasting interest and extreme usefulness.

Includes the work of over 100 experts in their fields

Prepared in cooperation with Technical Publishing Company

only $18.50

F.W. DODGE CORPORATION

DODGE BOOKS, F. W. Dodge Corporation
119 West 40th Street, New York 18, N. Y.

Send me a copy of PLANT ENGINEERING PRACTICE for 10 days free examination. At the end of that time, I will either remit $18.50, plus a few cents postage, or return the book without cost or obligation.

name_____

address_____

city_____ state_____

☐ Check enclosed. Same return privilege, Dodge pays postage.
☐ Send free catalog.

404

organized into 13 fact and idea-filled chapters . . .

1. SITES AND LAYOUT
industrial landscaping, parking lots, traffic, organizing plant and personnel for moving, modular units for plant and equipment layout, modernization.

2. CONSTRUCTION
subsurface exploration, adding mezzanine and extra floors to existing plant, shoreline construction, prefabricated shop partitions, eliminating TV interference, shielding workers from radiant heat.

3. HOUSEKEEPING AND SAFETY
noise control, fire safety, training company fire department, sprinklers, firedoor mechanisms, fire precautions, medical facilities, driver training, and more.

4. MATERIALS HANDLING
industrial rail systems, conveyors, cranes, fork lifts, cranes, tractor-powered rail systems.

5. MAINTENANCE
selling the maintenance program to management, forms and records, inventory control, vehicle maintenance, work scheduling, lubrication.

6. PAINTS AND PROTECTIVE COATINGS
color, corrosion resistance, safety, speed, design of spraying areas, rollers, special protective coatings — silicone finishes, epoxies, aluminum paint, plastisols.

7. MECHANICAL POWER AND PIPING SYSTEMS
ball and roller bearings, fluid power (including installation, selection of fluids, pumps, valves, accumulators and intensifiers), belt drives, compressed air systems, steam systems.

8. ELECTRIC POWER
dry and oil type transformers, electric motors, other electrical equipment, also installation and selection of ground systems, capacitors, and electric safety precautions and procedures.

9. LIGHTING
emergency installations, mercury, fluorescent, and incandescent systems, maintenance and installation of high ceiling fixtures, including use of overhead cars.

10. UTILITIES
power cable placement, intercoms, water softening, cafeteria design and maintenance, control of drinking water purity, recovery of industrial wastes, handling radioactive byproducts.

11. HEATING, VENTILATING AND AIR CONDITIONING
control against dust, heat, steam, odor, insects, radiation; installation and maintenance of fuel tanks, condensers, hot-water systems, oil burners and cooling systems.

12. QUALITY CONTROL
instrumentation, functions of instruments, dial gauges, use of isotopes and x-ray for quality control.

13. SHOPWORK
working with stainless steel, brazing, working with acrylic plastics, use of disc grinders, immersion heaters, adhesives, tool adaptations.

these are partial contents only

DATA FILE

(Begins on page 216)

448 Industrial Stack—Detailed information on a permanent, low cost refractory smoke stack for commercial and industrial applications is contained in 8-pp Bulletin IS-32. Gives product information, applications with boilers, furnaces, etc. Van-Packer Co., Div., The Flinkote Co.

449 Synthetic Rubber — Applications and characteristics of Viton—a fluorocarbon elastomer—are illustrated and discussed in 8-pp Elastomer Notebook Section 81. Photos showing the materials in applications are included. E. I. du Pont de Nemours & Co., Inc.

450 Water-Cooled Stoker—Design and operating advantages of the Vibragrate Stoker are outlined in this illustrated bulletin. A large cutaway view details component parts of the stoker. American Engineering Co.

451 Phenolic Plastics—A primary evaluation of the properties of company's phenolics and the combinations in which they are available, in thermosetting molding materials and industrial and coating resins, is featured in this illustrated bulletin. Durez Plastics Div., Hooker Chemical Corp.

452 Air Tools—Features and applications of company's line of air tools with torsion bar torque control are outlined in 48-pp Form 5200-B. Cutaway views illustrating design and construction features are included, as well as specification tables and photos of typical applications. Accessories for use with the tools are also covered. Ingersoll-Rand.

453 Industrial Wrenches, Hand Tools—Tools for production lines, maintenance work and product servicing are featured in a 156-pp Industrial Catalog 58-1. Loaded with pictures and tool facts, book describes in detail the complete line of over 4,000 tools—including chests and roll-cabs, wrenches and sockets of all types, screwdrivers, pliers, pullers, electric impact wrenches, etc. Snap-on Tools Corp.

Increase Storage Capacity with a C-F LIFTER

Here's 1 man—a C-F Lifter and an electric hoist handling 5 ton packs of sheet steel with speed, safety and economy. One C-F Lifter handles a wide range of sizes . . . adjustments are made by the operator in a few seconds, permitting the Lifter to shift from wide to narrow sizes in a few seconds. Made in capacities from 2 to 60 tons.

Write for Bulletin SL-30 for specific examples of C-F Lifter operation and economy.

CULLEN-FRIESTEDT CO.
1317 South Kilbourn Avenue • Chicago 23, Illinois

For more facts circle 660 on Reply Card

REPAIR FOR YOUR B&D TOOLS

For genuine Black & Decker repairs check Yellow Pages under "Tools-Electric" for address of nearby Black & Decker

FACTORY SERVICE BRANCH

Free tool inspection when requested • Genuine B&D parts used • Factory-trained technicians handle all work • Standard B&D Guarantee at completion of recommended repairs • Fast service at reasonable cost.

Or write for address of nearest of 48 branches to:
THE BLACK & DECKER MFG. CO., *Dept. S1710, Towson 4, Md.*

Black & Decker®
QUALITY ELECTRIC TOOLS

For more facts circle 659 on Reply Card

low maintenance cost

It costs you next to nothing to maintain your heating system when you have Reznor gas heaters. A few minutes per heater once a year for motor lubrication should be your total maintenance time. And no skilled labor is required. Heater failures? Simple, fool-proof design and quality construction make them a rarity.

LOW MAINTENANCE COST is just one of many reasons why Reznor gas unit heaters are right for so many plant heating jobs. Whether you need one heater to eliminate a "trouble" spot or enough units for a complete plant heating system, ask your Reznor distributor for details or write for your free copy of "Modern Heating".

Look for Reznor under "Heaters-Unit" in the Yellow Pages

REZNOR
WORLD'S LARGEST-SELLING DIRECT-FIRED
UNIT HEATERS

Reznor Manufacturing Company, 91 Union Street, Mercer, Pa.

For more facts circle 661 on Reply Card

NEW PLANT CONSTRUCTION — advance information on location, costs

Fairfield, Ala.—United States Steel Corp., 525 William Penn Pl., Pittsburgh, Pa., plans a major addition to its local tin mill here and will start construction at once for completion in 1960. The new facility will include a continuous annealing line, enabling steel strip to be heated up to 1350 F.

Magnolia, Ark. — Arkansas-Louisiana Gas Co., plans major addition to chemical plant of its subsidiary, Arkansas-Louisiana Chemical Corp., at local headquarters, here. Construction will begin at once on new facility for the production of ethane, propane and butane, in addition to chemicals now being manufactured.

Los Angeles, Calif.—Soule Steel Co., Rincon Annex, San Francisco, Calif., plans to construct a steel rolling mill on 22-acre site recently acquired here for the purpose. Construction of the plant, with an annual rated capacity of 36,000 tons of billet-sized ingots, will begin at once and is scheduled for completion by late 1959.

San Leandro, Calif.—Montgomery Ward & Co., 619 W. Chicago Ave., Chicago, Ill., plans a multi-million dollar expansion program for San Francisco Bay area. Program calls for construction of a paint plant, large warehouse and distribution center here and expansion of the retail store and mail order house in Oakland, Calif.

Seaford, Del.—E. I. du Pont de Nemours & Co., Inc., Textile Fibers Department, Nemours Building, Wilmington, Del., plans enlargement of facilities at company plant here including installation of new production equipment.

Port St. Joe, Fla.—Michigan Chemical Corp., headquartered at St. Louis, Mich., plans to construct a seawater magnesium plant here. New plant will produce chemical and refractory grades of magnesium oxide for use in the manufacture of house brick and other refractory products, for rubber and neoprene, paper, textiles, ceramics and other building materials.

Henry, Ill.—B. F. Goodrich Chemical Co., 2069 E. 9th St., Cleveland, O., plans expansion of new plant here. Expansion will provide facilities for the manufacture of an antiozonant chemical for use in the rubber and petroleum industries. Construction will get under way at once for completion by the spring of 1959.

Ashland, Ky.—Formation of the Ohio River Chemical Co., for the manufacture of caprolactam has been announced by the Industrial Rayon Corp., Cleveland, O., and the Spencer Chemical Co., Kansas City, Mo. New product is a basic raw material used in the manufacture of nylon. Construction of the plant will begin at once for completion by the spring of 1960. Cost reported to be about $10 million.

East Walpole, Mass.—Bird & Son, Inc., 47 Wilson St., plans to install a completely new rotogravure vinyl floor covering unit at company's Norwood floor covering plant. New unit will be installed at a cost of $3 million, and will provide for the manufacture of wider widths of Bird vinyl floor coverings.

Wyandotte, Mich.—Wyandotte Chemical Corp., Alkali Square, plans expansion and modernization of company's foundry operations at this plant. Work

MARSH *Mastergauge*

The gauge that has everything!

- **LEAK-PROOF ONE-PIECE CONSTRUCTION** . . . bourdon tube fused to socket and tip by exclusive "Conoweld" process.
- **STURDY "MARSHALLOY" CASE** . . . formed of boiler-plate-thickness steel, copper clad inside and outside to give it the corrosion resistance of solid copper. It's one third lighter, but four times stronger than cast iron.
- **PRECISION "MASTERGAUGE" MOVEMENT** . . . with such exclusive features as the coined sector gear.
- **AVAILABLE WITH STAINLESS TUBE AND SOCKET** . . . choice of stainless steels and alloys for all corrosive conditions.
- **WITH "RECALIBRATOR"** . . . quickest and best way to keep a gauge accurate.

These features are combined only in "Mastergauge", standard bearer for the broad line of Marsh Gauges . . . each the best of its kind. Ask for data.

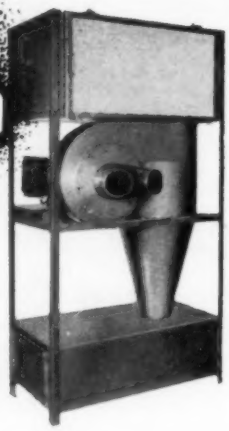
MARSH "THE STANDARD OF ACCURACY"

MARSH INSTRUMENT CO., *Sales Affiliate of Jas. P. Marsh Corp.*, Dept.W, Skokie, Ill.
Marsh Instrument and Valve Co. (Canada) Ltd. 8407 103rd St., Edmonton, Alberta.
Houston Branch Plant: 1121 Rothwell St., Sect. 15, Houston, Texas.

For more facts circle 662 on Reply Card

EFFICIENT—LOW COST

Dust Collection



Easy installation . . . efficient low-cost operation . . . simplified maintenance, make Dustkop *FIRST* among equipment to collect most all industrial dusts. There are Dustkop models to eliminate your dust problems . . . that are space saving, self-contained units, or exhaust type for rafter, ceiling or outside location. Write for descriptive literature.

DUSTKOP STOPS DUST

37 STANDARD MODELS TO CHOOSE FROM

• READY TO USE

Also a Complete Line of Mist Collectors

AGET MANUFACTURING COMPANY
1388 E. CHURCH ST. • ADRIAN, MICHIGAN

For more facts circle 663 on Reply Card

Load-Rated* DOES THE JOB!

LIFTING 30-TON STATOR FRAME WITH CROSBY-LAUGHLIN Load-Rated HOOKS

Heavy lifts demand the safe performance of Crosby-Laughlin* LOAD-RATED Hooks. Quality materials and quality manufacture produce LOAD-RATED Fittings for heavy lifting-handling jobs where safety, dependability is essential. Safe working capacity is stamped on each LOAD-RATED Fitting. You order . . . get guaranteed capacity. More than 2000 items in the *world's most complete line* of drop forged fittings for wire rope and chain are fully described in catalog available from construction, industrial and mill supply distributors. Or write:

*Trademark

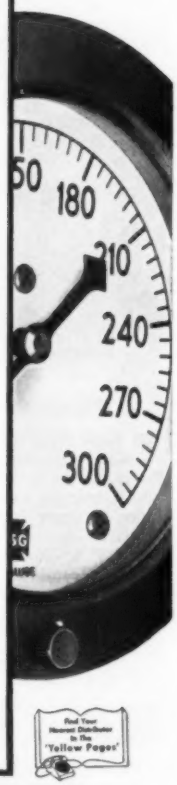
CROSBY-LAUGHLIN *Division*

AMERICAN HOIST & DERRICK COMPANY

FT. WAYNE 1, INDIANA

For more facts circle 664 on Reply Card

2 NEW LINES FROM U.S. GAUGE



1. "A" Line Pressure Gauges

Premium gauge construction, at up to 40% below premium price!

Meet A.S.A. Grade A Standards. Accurate to within 1% of scale range for middle (working) half of scale—1½% for remainder.

Wide choice of options. Variety of cases (aluminum standard), mountings, movements, Bourdon tubes. Dial sizes 3½ to 12 inches. Pressures to 10,000 psi.

Long life, easy maintenance. Extra rugged. Superior USG design. Entire gauge internals can be removed as a unit for inspection or calibration.

Write for Catalog 305.

2. Supertherm Dial Thermometers

Now, one comprehensive line from one source, offering:

Direct or remote reading. Mercury, organic liquid, vapor or gas fills for temperature measurement from —350° to 1000° F. **Remote:** up to 125 feet from indicator. **Direct:** rigid-mounting thermometers, or "Multi-Angle" that can be adjusted to any practical mounting angle.

Widest possible choice. Full range of bulb shapes, sizes and materials, and case designs. Cases in phenolic or aluminum. Sizes from 3½ to 8½ inches.

Write for Catalog 205.

USG **UNITED STATES GAUGE**
DIVISION OF AMERICAN MACHINE AND METALS, INC., SELLERSVILLE, PA.

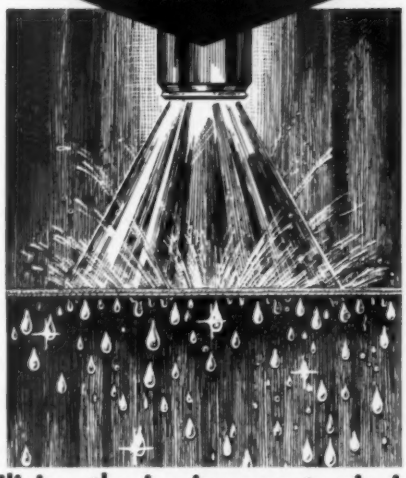
Find Your Nearest Distributor in the "Yellow Pages"

For more facts circle 665 on Reply Card

FOR PRECISION PRODUCTION and MICRO-INCH FINISHES...

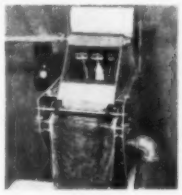
INFILCO INTRODUCES

the IMPINJO filter
(TRADEMARK)



utilizing the impingement principle to FINE CLEAN COOLANTS AND CUTTING OILS

Clean coolants play a vital part in maintaining high quality, close tolerance production and reducing rejects. The new "IMPINJO" Filter removes even microscopic solids. Ferrous or non-ferrous metals and other solids are removed with equally high efficiency. Filter operation is completely automatic. Disposable media carries away dry filtered solids and produces clean coolant for continuous re-use. Savings in coolants, tool and wheel life are important secondary benefits. Capacities available for single machine or central systems.



INFILCO
INCORPORATED
P.O. Box 5033
TUCSON, ARIZONA

INFILCO

Please send BULLETIN 9020 ☐

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

Ferrous ☐ Non-Ferrous ☐ Coolant ☐ Cutting Oil ☐

INFILCO Incorporated Dept. PE Tucson, Ariz.

For more facts circle 666 on Reply Card

New Plant Construction

(Continued from page 238)

will get under way as soon as preliminary engineering work is completed. Modernization is expected to be completed by late 1959 at a cost of $500,000.

Florham Park, N.J.—Strahman Valves, Inc., 20 Hudson St., New York, N. Y., plans to construct a plant here for the production of valves and gages. New one-story structure will be of brick and masonry construction and will have a floor area of 90,000 sq ft. Cost reported to be about $1 million.

Morris Plains, N. J.—Airtron, Inc., a division of Litton Industries, Inc., headquartered in Linden, N. J., plans expansion of its ferrite development and manufacturing program in the 100,000-sq ft plant formerly occupied by Monroe Calculating Co., also a division of Litton.

Barberton, O.—Columbia-Southern Chemical Corp., subsidiary of Pittsburgh Plate Glass Co., 1 Gateway Center, Pittsburgh, Pa., has announced that construction of a multi-million dollar cement plant is now under way on large building site here. Plant is scheduled to begin production by late 1959.

Aliquippa, Pa.—Jones & Laughlin Steel Corp., 462 Gateway Center, Pittsburgh, Pa., plans to install a new high speed continuous annealing line for tin-plate at company works here. New facility will cost in excess of $7.5 million and will have top operating capacity of 30 tons of tin-plate per hour. Work will begin at once for completion in 1959.

Brackenridge, Pa.—Allegheny Ludlum Steel Corp., Oliver Building, Pittsburgh, Pa., has started construction on a major addition to its laboratory research center located here. The new metallurgical laboratory will have 62,000 sq ft of available floor space in a structure of stainless steel panels, glass and masonry.

Glassport, Pa.—Copperweld Steel Co., Wire & Cable Division, 39 Teifeld St., subsidiary of Copperweld Steel Co., Pittsburgh, Pa., plans an expenditure of $1.5 million for new facilities for production of wire and strand at local plant here.

Hazelton, Pa.—Highway Trailer Co., Edgerton, Wis., plans to expand company operations in the manufacture of truck trailers and will lease a new $1.25 million plant to be built for the firm by the Greater Hazelton Community-Area New Development Organization, Inc., of Hazelton, Pa. Plant is scheduled to open early in 1959.

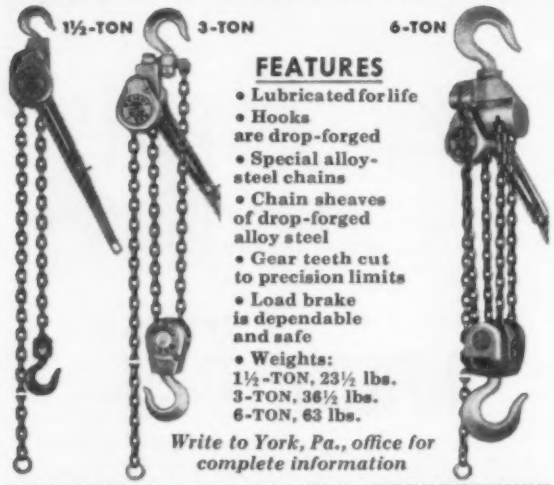
Monroeville, Pa.—United States Steel Corp., 525 William Penn Pl., Pittsburgh, Pa., plans to construct a building at company's research center here. New facility will have a floor area of 54,000 sq ft and will be used for electromechanical development. Construction will get under way at once for completion by late 1959. Cost of new facility with equipment reported to be about $1 million.

Youngwood, Pa.—Robertshaw-Fulton Controls Co., 110 E. Otteman St., Greensburg, Pa., plans to construct a plant here for the manufacture of thermostatic control devices. Work will get under way at once on the new $2.5-million plant which will be completed by the summer of 1960.

Garland, Texas—Temco Aircraft Corp., Box 6191, Dallas, Texas, plans large addition to company's engineering center located here. Extension, to be completed sometime in 1959, will be used to expand company laboratories and design areas and to increase company's experimental engineering section.

Milwaukee, Wis.—Cleaver-Brooks Co., 493 E. Keefe Ave., plans a $2 million expansion program. Company which manufactures packaged boilers will build a new $1-million plant with 25,000 sq ft for production and test areas at Stratford, Ont., Canada. The remaining sum will be expended for a 70,000-sq ft addition to company's eastern manufacturing center at Lebanon, Pa.

NEW WRIGHT
Type "C" Pull-A-Ways
THREE SIZES—1½, 3 and 6-Tons



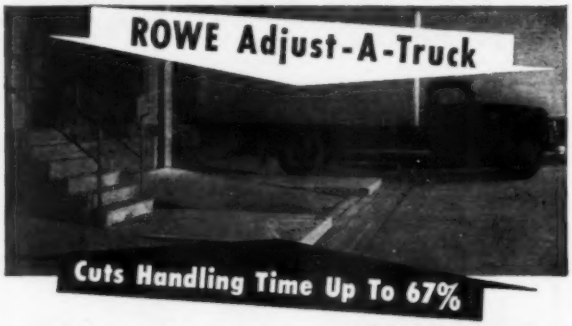
FEATURES
- Lubricated for life
- Hooks are drop-forged
- Special alloy-steel chains
- Chain sheaves of drop-forged alloy steel
- Gear teeth cut to precision limits
- Load brake is dependable and safe
- Weights: 1½-TON, 23½ lbs. 3-TON, 36½ lbs. 6-TON, 63 lbs.

Write to York, Pa., office for complete information

Wright Hoist Division
AMERICAN CHAIN & CABLE
ACCO
York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

For more facts circle 667 on Reply Card

Move Greater Pay Loads . . .
Faster, Safer, With Money Saving



. . . Saves Man Hours and Dock Space

■ Here's the low cost answer to positioning any highway carrier to proper dock height when it is impossible to use dock leveling ramps because of construction or space limitation. This 40,000 lb.-capacity hydraulic truck leveling device has 24" up-down travel and features: Low Initial, Installation and Operating Cost • Short Amortization Period • Rugged Construction for Long-Life Service • Minimum Maintenance • Exceptional Ease of Operation.

Write for our new folder—It's free of course

Planning service available without cost or obligation

ROWE METHODS, INC.

2534-D Detroit Ave. • Cleveland 13, Ohio

For more facts circle 668 on Reply Card

How Ni-Rod "55" builds up worn cast iron... keeps repair cost down

When the owners of the M V Sunprincess heard it would cost them over $7,200 to replace all six worn ship pistons, they quickly called in J & R Weir Ltd., Marine Engineers, Montreal.

These engineers in turn recommended a Ni-Rod "55"* repair job – welding to be done by Welding Engineers Ltd., Montreal.

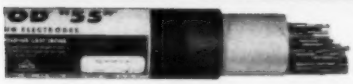
Wear ran as high as 1/8 inch on some of the piston ring grooves. But with Ni-Rod "55" Electrodes, weldors soon had all six pistons back in the ship at a total cost of $2,450 – a saving of over $4,750.

For your jobs

Ni-Rod "55" can be used to build up worn areas in almost all cast iron parts. Auto, truck, or ship pistons . . . valve seats . . . cylinder walls . . . are just a few. And the cost is just a fraction of what replacement would cost. What's more, with Ni-Rod "55", the repair is done quickly and easily. Welds are strong, sound, highly machinable.

Write for "Repair Cast Iron Parts Quickly and Easily" for the complete Ni-Rod "55" story. *Registered trademark

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N. Y.



INCO WELDING PRODUCTS

ELECTRODES • WIRES • FLUXES

For more facts circle 669 on Reply Card

CUT COSTS 4 WAYS

with **AURORA®** *End-Suction Centrifugal* **PUMPS**

AURORA TYPE BCH

EXTREMELY HIGH EFFICIENCY
Required head and capacity delivered with lower HP motors. Saves space, saves initial outlay, saves operating costs.

LOW NPSH CHARACTERISTICS
Saves head room where critical suction conditions exist.

LONGER TROUBLE-FREE OPERATION
Better construction, finer materials keep lines operating for less cost.

FASTER MAINTENANCE WHEN NEEDED
Exclusive features enable easy disassembly without disturbing pump-motor alignment or discharge piping.

SEND FOR BULLETIN 119-C

AURORA Always PUMPS
AURORA PUMP DIVISION
THE NEW YORK AIR BRAKE COMPANY
AURORA • ILLINOIS

44 LOUCKS ST. AURORA • ILLINOIS

For more facts circle 670 on Reply Card

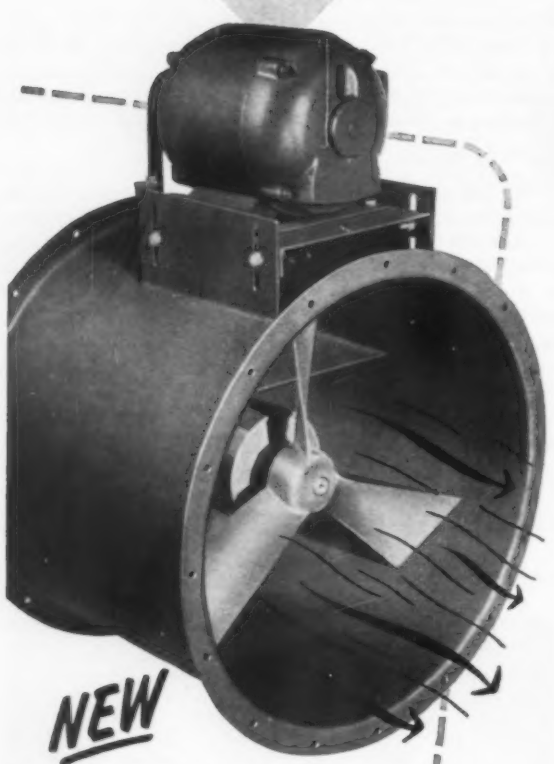
HENDERER
HYDRAULIC PRESSURE TEST PUMPS

Designed for testing boilers, condensers, heat exchangers, pressure vessels, and pipe lines . . . simple construction requires minimum maintenance. Horizontal lift type bronze valves can be reground without removing from pump. Higher pressure pump is all bronze with stainless steel piston. Write for literature on pumps to 10,000 psi.

A. L. HENDERER'S SONS
683 Maryland Avenue, Wilmington 99, Delaware

For more facts circle 671 on Reply Card

expel
FUMES, HEAT AND DUST
at LOW COST



NEW
PROPELLAIR®
belt driven Tubeaxial Fans

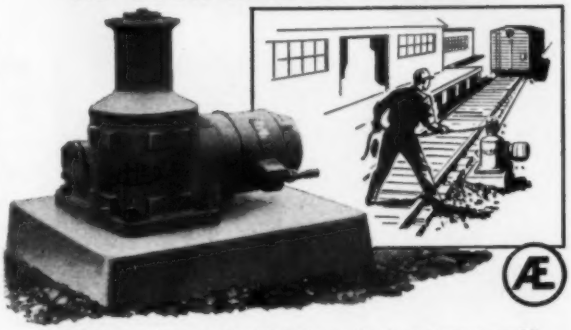
Type "BT" Propellair Fans can be purchased and operated at low cost to handle difficult atmospheres such as highly corrosive, explosive, inflammable, grease or dust-laden air. Straight-line design permits easy, inexpensive installation. Platforms and duct elbows are eliminated. The externally mounted Robbins & Myers motor, sealed cast iron housed bearing assembly, air-tight drum and belt-tube provide complete protection. Standard models can handle temperatures up to 450° F. Propellair "BT" tubeaxial fans are available in sizes 16" to 60" for from 2000 to 85000 CFM air delivery.

WRITE FOR BULLETIN NO. 620-PE

R&M PROPELLAIR®
DIV. OF ROBBINS AND MYERS, INC.
SPRINGFIELD, OHIO
Certified Ratings
PFMA

MOVING AIR IS OUR BUSINESS
For more facts circle 672 on Reply Card

NOW! STOP WASTEFUL EXPENSE AT YOUR RAILROAD SIDING



IF YOU actually saw a Lo-Hed Car puller in operation you'd probably order one in a hurry. It is a first rate investment — pays for itself fast. It puts a stop to shifting charges. Cars get loaded and unloaded in record time. Demurrage charges are slashed. Industrial accidents are minimized... And a Lo-Hed Car Puller saves money *inside* a plant, too — pulls loads in a straight line, up grades and around corners.

Lo-Hed Car Puller is rugged, electrically-driven, built for trouble-free service. Write for folder telling you how to use a Car Puller in your plant.

AMERICAN ENGINEERING COMPANY
Dept. CP-181, Wheatsheaf Lane & Sepviva St., Philadelphia 37, Pa.
CANADIAN SUBSIDIARIES: Affiliated Engineering Corporations, Ltd.
Montreal, P. Q. . . . Bawden Industries Ltd., Toronto, Ont.
AE Products are: Taylor, Perfect Spread and Vibra-Grate Stokers, Hele-Shaw & Hydramite Fluid Power, Lo-Hed Hoists, Lo-Hed Car Puller, Marine Deck Auxiliaries.

For more facts circle 673 on Reply Card

KO9
...the amazing electric motor cleaner!

KO9—your Short Cut to clean electrical equipment—does an outstanding job of cleaning and degreasing motors, generators, controllers, switches, panels, instruments, meters, refrigeration lines, etc.

Cleaning motors is a cinch—all you do is immerse the running motor in KO9, remove it minutes later as clean as new!

KO13 . . . YOUR SHORT CUT TO FAST, SAFE CLEANING

KO13 is a truly sensational general purpose safety solvent that will clean just about everything . . . leaves surfaces smooth and sparkling clean!

KO13 quickly removes grease, oil, dirt and grime from metal, wood and paint.

Ask for Literature Today

KOR CORPORATION
710 — Box 485
GARY, INDIANA

For more facts circle 677 on Reply Card

ADVERTISERS IN THIS ISSUE

When writing to advertisers please tell them you saw their ad in Plant Engineering — or send us the number directly below ad — use the post card in "Bulletin Insert."

Adams Co., Inc. R. P. 226
Aget Manufacturing Co. 238
Alan Wood Steel Co. 47
Allen-Bradley Company 159-160
Alloy Steel Products Co. 209
Aluminum Company of America 21, 137, 217
Amerace Corporation
American Hard Rubber Div. 202
American Air Filter Co.
Air Filter Division 17
American Chain & Cable Co.
Wright Hoist Division 40-41, 240
American Engineering Company 242
American Hoist & Derrick Co. 189, 239
Anaconda Wire & Cable Co. 56-57
Armstrong Bros. Tool Co. 224
Armstrong Machine Works 51
Aurora Pump Division
New York Air Brake Co. 241

Bayley Blower Company 28
Betz Laboratories, Inc. 37
Bell & Gossett Company 210
Black & Decker Mfg. Co. 61, 237
Bowser, Inc. 16
Buell Engr. Company 166
Buffalo Forge Company 67
C & D Batteries, Inc. 88
Clarage Fan Company 197
Cleaver-Brooks Company 46
Cleveland Tramrail Division
Cleveland Crane & Engineering Corporation 6
Colorado Fuel & Iron Corp. 169, 184
Cope Division, T. J.
Rome Cable Corporation 154
Copon Associates 157
Corning Glass Works 164
Crane Company 139
Crouse-Hinds Company #3
Cullen-Friestedt, Inc. 237
Cutler-Hammer, Inc. Back Cover
Cyclotherm Div. National
U. S. Radiator Corp. 205

Darling Valve & Mfg. Co. 156
Day Company 152
Deming Company 148
Dodge Corporation, F. W. 236
Dodge Mfg. Corporation 146, 147
Dollinger Corporation 225
Du Pont De Nemours & Co., E. I. 22-23, 69, 177
Durametallic Corp. 228

Esso Standard Oil Co. 63

Faultless Caster Corporation 186
Federal Pacific Electric Co. 153
Feedrail Corporation 182
Fiske Bros. Refining Co. 36
Flexible Steel Lacing Co. 222
Foster Company, Benjamin 168
Foster Company, L. B. 226

Garland Mfg. Company 230
Garlock Packing Company 12-13
Gates Rubber Company 59
General Electric Company
Apparatus Division 71 thru 75, 140, 141-142
Distribution Assemblies 45
Lamp Division 30-31
Tube Department 155
General Radio Company 203
Goodrich Company, B. F. 49
Goodyear Tire & Rubber Co., Inc. 1
Goulds Pumps, Inc. 70
Grinnell Company 5
Gulf Oil Corporation 54-55

Hagan Chemicals & Controls, Inc. 235
Harnischfeger Corporation 86-87
Henderer's Sons, A. L. 241
Hobbs Corp., John W. 230
Homestead Valve Mfg. Co. 221
Huntington Laboratories, Inc. 207
Hunt Valve Company 39

Infilco Incorporated 239
Insul-8 Corporation 224
International Nickel Co., Inc. 241
Intrusion-Prepakt, Inc. 206
Invincible Vacuum Cleaner Mfg. Co. 170
ITE Circuit Breaker Co.
Small Air Circuit Breaker Div. 181

Jeffrey Mfg. Company 198
Jenkins Bros. 29
Johns-Manville 20
Joy Manufacturing Company 27

Koppers Company, Inc. 220
KOR Corporation 242

Lamson Corporation 68
Leschen Wire Rope Division
H. K. Porter Co., Inc. 174
Link-Belt Company 11, 183
L-O-F Glass Fibers Co. 84-85
Lubriplate Division
Fiske Bros. Refining Co. 36

Macwhyte Wire Rope Co. 145
Mahon Company, The R. C. 83
Manheim Mfg. & Belting Co. 32
Marley Company 66, 191
Marsh Instrument Co. 238
Modine Mfg. Company 179
Mueller Brass Company 192

Natco Corporation 165
National Aluminate Corp. 24
National Electric Products 171
Natl. Exposition of Power & Mech. Engr. 162
Niagara Blower Company 232
Norgen Co., C. A. 64

Otis Elevator Company 34-35

Pangborn Corporation 193
Patent Scaffolding Co., Inc. 227
Pennsylvania Flexible Metallic Tubing 38
Pennsylvania Pump & Compressor Co. 190
Permatex Company, Inc. 163
Philadelphia Hoist Division 208
Pittsburgh Coke & Chemical Co. 77
Pittsburgh Corning Corp. 219
Porter Company, Inc., H. K.
Leschen Wire Rope Div. 174
Powell Co., William 201
Propellair Division
Robbins & Myers, Inc. 242
Purolator Products, Inc. 180
Radiant Lamp Company 196
Ramset Fastening System 176
Reading Crane & Hoist Corp. 233
Reznor Manufacturing Co. 237
Richards-Wilcox Mfg. Co. 231
Ridge Tool Company 167
RLM Standards Institute, Inc. 149
Robbins & Myers, Inc.
Industrial Motors 175
Rockbestos Products Corp. 185
Rockwell Company, W. S. 204
Rome Cable Corporation 133, 135
Roura Iron Works, Inc. 207
Rowe Methods, Inc. 240

Sarco Company, Inc. 187
Schneible Co., Claude B. 208
Schramm, Inc. 172
Sexauer Mfg. Co., J. A. 204
Skil Corporation 14-15
Sly Mfg. Company, W. W. 50, 188
Socony Mobil Oil Company 18-19
Sola Electric Company 200
Spencer Turbine Company 62
Square D Company 2nd Cover, 3rd Cover
Standard Oil Co. (Indiana) 33
Standard Pressed Steel Co. 215
Sugar Beet Products Co. 52
Sutorbilt Corporation 178

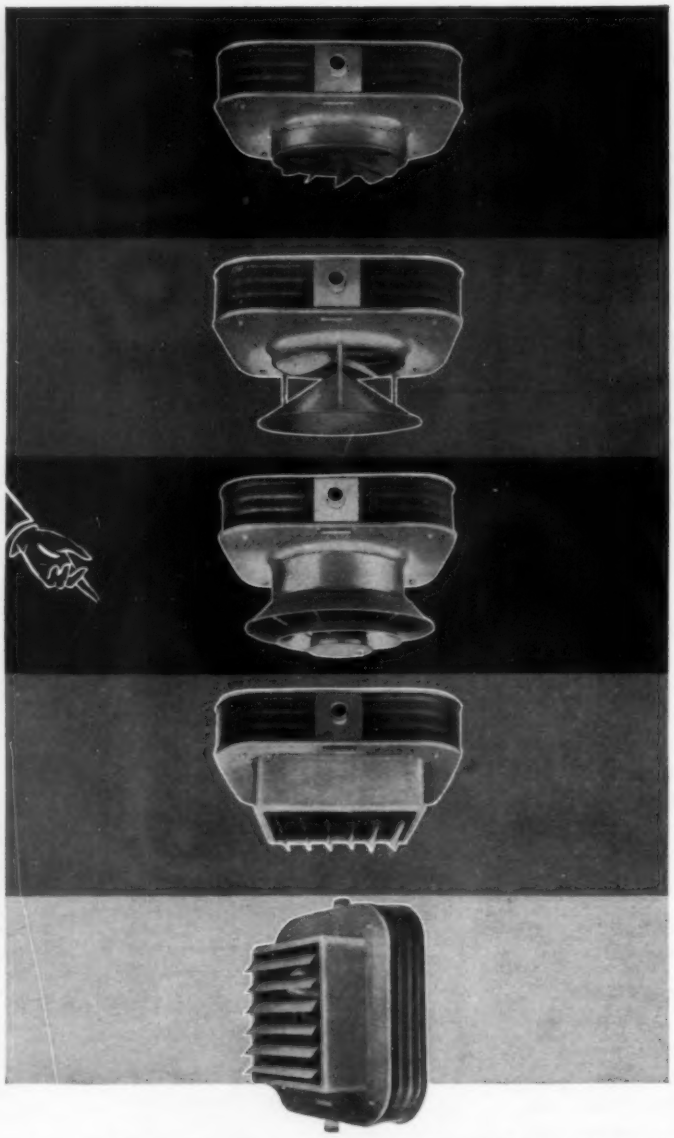
Templeton, Kenly & Company 228
Thomas Flexible Coupling Co. 4
Titusville Iron Works Co. 199
Tube Turns Plastics, Inc. 173

United States Gauge 239
United States Steel Corp. 65, 78-79

Van-Packer Company Div. of
The Flint Kote Company 223
Viking Pump Company 224
Vogt Machine Co., Henry 80

Warren Webster & Co. 244
Wayne Pump Company 48, 161
Western Machinery Company 232
Westinghouse Electric Corp. 7 thru 10, 194-195
Westinghouse Electric Corp.
Lamp Division 53
Whitney Blake Company 158
Wickwire Spencer Steel Div. of CF&I 169, 184
Wiegand Company, Edwin L. 150-151
Wright Hoist Division
American Chain & Cable Co. 40-41, 240

Yarnall-Waring Company 3



Webster Unit Heaters for Every Space Heating Need

The complete line of Webster Unit Heaters offers the simple, practical low-cost answer to every space heating problem in industrial, institutional, and commercial buildings.

Webster Little Giant Unit Heaters, illustrated here, for example, with their versatility of outlet arrangements, with capacities ranging from 34,000 to 68,000 Btu/hr and IUHA ratings for capacity and sound, make the choice of the right unit both simple and practical.

In addition to 34 models of the Webster Little Giant Unit Heaters, you can choose from 24 Webster Propeller Fan Unit Heaters, Webster Giant Unit Heaters in 9 casing sizes, Webster Deluxe Cabinet Heaters and Webster Gas Unit Heaters.

For quiet, dependable performance, put your Warren Webster Man in your space heating plans. See him, or write for Bulletins. Warren Webster & Company, Camden 5, New Jersey. Since 1888. Offices in principal U.S. cities and Canada.

WEBSTER'S
FINEST
PRODUCT

the Warren Webster Man

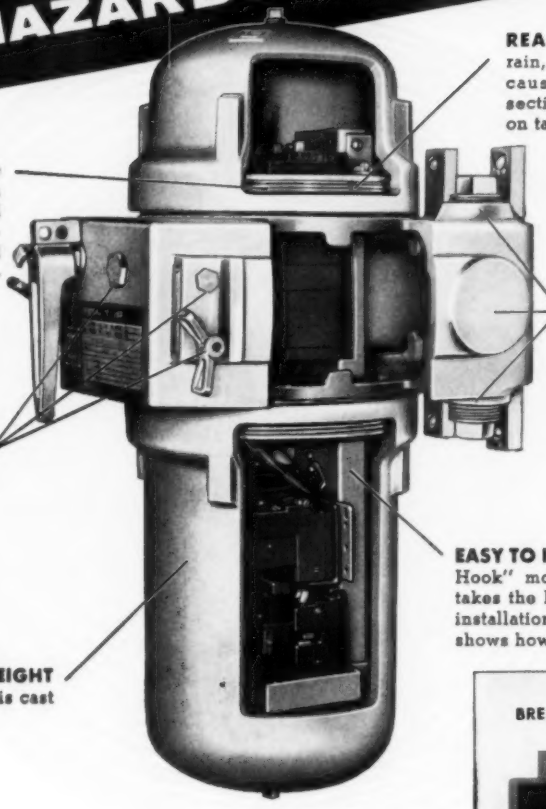
WARREN WEBSTER

HEATING . . . COOLING

For more facts circle 674 on Reply Card

Square D announces...

NEW SPIN TOP ENCLOSURE FOR HAZARDOUS LOCATIONS



REAL PROTECTION against rain, dust, dirt and weather because male threads on collar section engage female threads on tank.

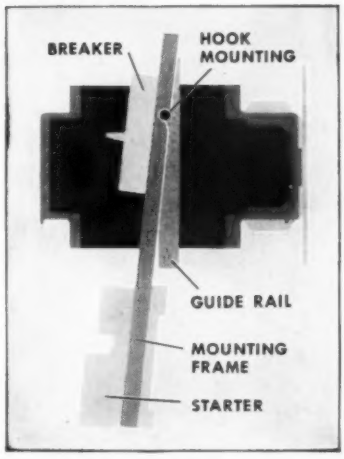
DAMAGE-RESISTING Acme thread. If you've struggled with "banged-up" threads, you'll appreciate this feature. It's always a breeze to put on and take off tanks for installation, inspection or maintenance.

INCREASED WIRING SPACE and through-feed conduit entrances for horizontal tap-offs.

EASY TO ADD pushbuttons or selector switches with easy-to-buy, easy-to-use "off-the-shelf" parts kits.

EASY TO INSTALL • "Slide and Hook" mounting arrangement takes the hard work out of the installation job. Diagram below shows how.

STRONG and LIGHTWEIGHT The complete enclosure is cast aluminum.



SLIDE and HOOK MOUNTING

4 SIZES FOR STARTERS SIZE 0 THROUGH 5

CLASS I, GROUP C and D • CLASS II, GROUP E, F, and G

The new **SPIN TOP** enclosure is available from your Square D Distributor in three ways—complete device, enclosure only, or components only...for reversing and non-reversing across-the-line starters and combination starters. And for combination and non-combination two-speed starters.

Write FOR BULLETIN 9990

Square D Company, 4041 North Richards St., Milwaukee 12, Wis.

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

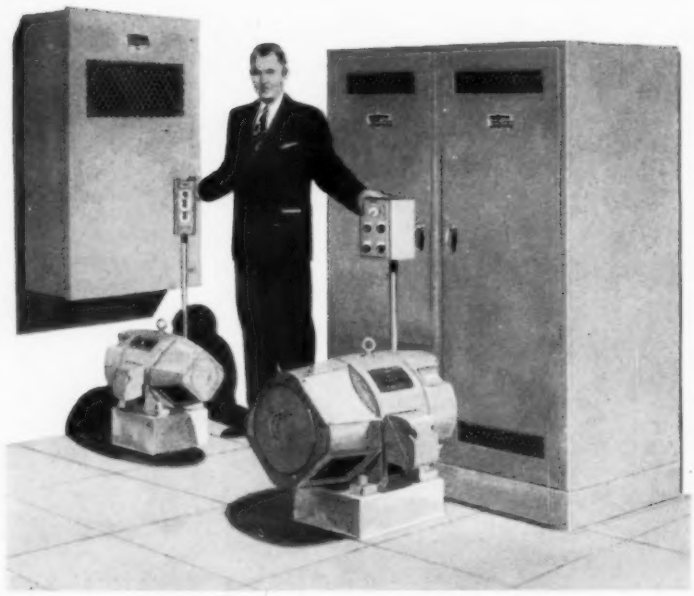
SQUARE D COMPANY

For more facts circle 675 on Reply Card

Cutler-Hammer presents ULTRAFLEX the spectacular STATIC POWER Adjustable Speed Packaged Drives

NO MOVING PARTS!

Cutler-Hammer Ultraflex® Packaged Drives provide outstanding savings in installation, operation, and maintenance



ULTRAFLEX • *E* 25 hp ULTRAFLEX • *M* 100 hp

Ultraflex Packaged Drives offer new opportunities for quick, cost-cutting installations. Light, compact static power conversion components have replaced the conventional m-g set resulting in substantial savings in size and weight. Ultraflex Packaged Drives save up to 50% in valuable floor area . . . up to 75% in weight. Ultraflex units require no balancing or alignment attention during installation.

Ultraflex Packaged Drives provide a new high standard of operational efficiency and ultra-responsive speed control. Exclusive Ultraflex static power conversion systems guarantee greater efficiency than ever possible with conventional drives. Every Ultraflex Packaged Drive works perfectly without forced ventilation which means less power is consumed as unwanted heat. Also, Ultraflex Packaged Drives are noise and vibration free.

Dependable, maintenance-free performance is one of the most outstanding achievements of the all new Cutler-Hammer Ultraflex Packaged Drives. With Ultraflex Static Power Conversion Systems there are no bearings to lubricate. There are no commutators to service, no brushes to replace. There are no shafts to align, no couplings to maintain, no inertia loads to balance. There are no ventilation fans, no filters to clean or change.

Cutler-Hammer Ultraflex Packaged Drives are available in two forms . . . Ultraflex E—the 1 to 40 hp, low cost electronic type adjustable speed drive and Ultraflex M—the 1 to 200 hp, ultra-efficient magnetic amplifier type adjustable speed drive. Both forms come complete with the Ultraflex control unit, heavy-duty D-c drive motor and operator's control station. For detailed information, write today on your company letterhead for the new Ultraflex E Bulletin EN64-U274 or the new Ultraflex M Bulletin EN65-U274. CUTLER-HAMMER Inc., Milwaukee 1, Wis.

CUTLER·HAMMER
CONTROL
C·H

Cutler-Hammer Inc., Milwaukee, Wis. *Division:* **Airborne Instruments Laboratory.** *Foreign:* **Cutler-Hammer International, C. A.**
Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.; Intercontinental Electronics Corporation, Inc.

For more facts circle 676 on Reply Card

NOVEMBER, 1958

Plant Engineering

IN THIS ISSUE

Simple Applications for Thermistors 88
The Easy Way to Maintenance Stores Control—
Reordering Chart and Forms Simplify the Job 90
Sh-h-h! Nylon at Work 93
Steam Trap Selection—
III. Under Excess Heat Exchange Area Conditions 94
Trouble-Free Concrete Floors 96
Monitoring Radioactive Wastes 98
Radiant Heating Units Solve No-Space Problem 101
How To Specify and Apply A-C Motors
to V-Belt Drives 102
When Pumps Wear—
Is It Erosion, Corrosion, or Both? 106
Machine Tool With a "Seeing Eye" 109
Construction Specifications
IV. Analyzing Bids, Signing Contract 110
Preplan Your Painting Program—
Result Will Be Better Coating at Less Cost 113
TVX—An X-Ray Unit for Automated Quality Control 117
Wire Rope Sling Study 118
Machine for Hardfacing of Curved Surfaces 121
Planned-In Materials Handling—
Plant Built Around Storage Conveyor 123
AIPE in First International Meeting 126
Battery Maintenance Insures Product Output 128

REGULAR DEPARTMENTS

'Round About With the Editors 2
Bulletins and Catalogs 21
Backtalk and Forethoughts 28
Plant Engineers' Digest 38
Operation and Production 54
Court Decisions 81
What's Just Ahead in This Issue? 87
News from the Plants 132
New Plant Construction 134
New Products and Processes 148
Review of New Books 212
Industrial Films 216
Data File of Commercial Literature 224
Advertisers' Index 251

The magazine that helps **plant** engineers with their everyday problems

Volume 12, No. 11 Circulation of this issue 51,374